

## NEW SPECIES OF RHODODENDRON.

BY

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### I.

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***Rhododendron achroanthum*, Balf. f. et W. W. Sm.**

Suffrutex ad 6 dm. altus parvifolius multiramis. Ramuli stricti annui subvirgati ad 2 cm. longi annotini circ. 1.5 mm. diam. squamulis peltatis fuscis porriginosis seniores nigricantes mox decorticantes. Alabastrorum parvulorum oblongorum perulae paucae externae ovatae dense ferrugineo-lepidotae internae membranaceae oblongae obtusae lepidotae et ciliatae. Folia circ. 1.6 cm. longa petiolata; lamina coriacea crassa elliptica circ. 1.3 cm. longa circ. 8 mm. lata apice rotundata mucrone verruculoso parvulo margine leviter revoluta basi obtusa vel late cuneata supra opaco-viridis squamulis plurimis peltatis uniformibus haud ubique contiguis persistentibus ex umbone sucino-nitente instituae albida aedificatis induta costa media subsulcata vix conspicua subtus fusco-punctata squamis bicoloratis vix contiguis in strata duo aequaliter dispositis—strati superioris squamae longius stipitatae omnino fusco-brunneae umbone fere atro inferioris albidae vel intra institam annulatum sucino-nitentes—et ad areolas esquamatas papillis epidermicis subquadratis ceriferis vestita, costa media supra subsulcata vix conspicua subtus leviter prominula venis primariis utrinque occultis; petiolus circ. 2.5 mm. longus fusco-lepidotus. Flores in umbellam terminalem 3-floram dispositi; bracteae mox deciduae; pedicelli purpurei vix 2 mm. longi albedo-lepidoti. Calyx atropurpureus circ. 4 mm. longus cupula circ. 0.5 mm. longa dense lepidota lobis oblongis vel ellipticis obtusis subaequalibus in medio dorso albo-lepidotis margine ciliatis. Corollae roseo-purpureae in sicco circ. 1.2 cm. longae tubus latus infundibuliformis circ. 5 mm. longus extus lepidotus intus breviter puberulus, lobi oblongi apice rotundati margine undulati extus albo-lepidoti. Stamina 5 (nunc 6) corolla longiora filamentis purpureis ad faucem corollae supra ovarium dense albo-villosis. Ovarium ovoideum albedo-pilosum et squamulis paucis



flavescentibus ad verticem praeditum; stylus basi plus minusve pilosus purpureus corollam et stamina longe superans; stigma discoideum atro-purpureum lobulatum.

Planta *Rh. rupicolo*, W. W. Sm. valde affinis forsanique illius microforma, corolla roseo-purpurea, staminibus plerumque 5, ovario ex toto albido-piloso diversa.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 12,000–13,000 ft. Shrub of 2 ft. Flowers dull deep magenta red. On open cliffs. G. Forrest. No. 12,581. July 1914.

This species is recognisable at sight from *Rh. rupicolum*, W. W. Sm., its close ally, by the paler colour of the flowers. In habit and foliage the two plants are alike. *Rh. achroanthum* has commonly 5 stamens—in only one flower, to be sure there are but few flowers altogether on the specimens, have I found 6—whilst *Rh. rupicolum* has 10. A difference in the ovaries of the two plants seemed at first to be most distinctive, but it may not have this importance. In *Rh. achroanthum* the ovary is grey in colour, being coated to the top with adpressed hairs; only at the summit are to be found a few lepidote scales amongst the hairs. In *Rh. rupicolum* the ovary in the upper two-thirds is densely lepidote and only the basal part has adpressed hairs. The general aspect of the plants suggests *Rh. achroanthum* as being only a variety of *Rh. rupicolum*, and it may be so, but the flower colour is very characteristic.

See also p. 299.

### **Rhododendron acraium**, Balf. f. et W. W. Sm.

Fruticulus aromaticus parvifolius ad 1.5 m. altus breviter verticillatim ramosus. Ramuli annui breves ad 2 cm. longi hornotini dense citrino-lepidoti annotini 1.5 mm. diam. fulvi dense porriginosi seniores grisei nigro-tuberculati perulis persistentibus haud vestiti deinde decorticantes. Alabastrorum oblongorum acutorum vel obtusorum perulae mox deciduae externae coriaceae ovatae carinatae mucronulatae fulvae dorso lepidotae apicem versus subciliatae intus puberulae ad 4 mm. longae interiores subspathulatae submembranaceae flavidae carinatae apice rotundatae extus lepidotae intus puberulae margine hirsuto-ciliatae ad 8 mm. longae ad 2 mm. latae. Folia petiolata vix ad 2 cm. longa; lamina crasse coriacea oblonga vel oblongo-elliptica circ. 1.5 cm. longa 8 mm. lata apice mucrone corneo recto terminata margine revoluta stipitum squamarumque vestigiis notata basi obtusa nec cordulata supra atro-viridis plana (costa media subsulcata caeteroquin venarum reti occulto) squamarum juvenillium vestigiis siccis subasperata (in juventute pagina margineque citrino-lepidotis esetulosis) infra fulva (in

juventute dense citrino-lepidota) porriginosa squamis peltatis inaequaliter stipitatis longioribus prolatis concoloribus umbone convexo plus minusve erubescente institaque late fimbriata praeditis (nunc paucis intensius coloratis punctiformibus) stratum superficiale supra squamas inferas plurimas incoloratas construentibus costa media vix apparente; petiolus ad 4 mm. longus furfuraceo-lepidotus. Flores albi in umbellam parvam capituliformem circ. 8-floram rhachi puberula et lepidota dispositi; bractae steriles coriaceae late ovatae carinatae obtusae extus fulvae dorso plus minusve lepidotae margine minute ciliatae mucronulatae ad 5 mm. longae fertiles subramentaceae obovato-spathulatae circ. 7 mm. longae 3.5 mm. latae extus lepidotae margine apiceque ciliatae intus puberulae; prophylla membranacea subspathulata calyci aequilonga minute ciliata dorso lepidota circ. 6 mm. longa 1.5 mm. lata; pedicelli circ. 3 mm. longi lepidoti. Calyx circ. 4 mm. longus ad<sup>4</sup>basim fissus lobis 5 inaequalibus oblongis obtusis vel subtruncatis erosis circ. 2 mm. latis nunc per paria connatis viridibus membranaceis dorso margineque lepidotis eciliatis vel rarissime ciliis paucis ad apicem praeditis intus glabris. Corollae tenuis 1.4 cm. longae obliquae tubus circ. 6 mm. longus extus glaber intus villosulus in limbum antice subrepandum postice suberectum sursum explanatus lobis 5 inaequalibus imbricatis rotundatis lobulato-crenulatis maximo circ. 6 mm. diam. Stamina inclusa circ. 5 mm. longa filamentis supra basin incrassatis pilosiusculis antheris oblongis circ. 1.5 mm. longis. Ovarium 5-lobatum circ. 1.5 mm. longum dense flavido-lepidotum; stylus vix 1 mm. longus clavatus stigmate lobato coronatus.

Species *Rh. cephalanthoidi*, Balf. f. et W. W. Sm. affinis sed foliis juvenilibus esetulosis, adultis minoribus, indumento subfoliari adulto compactiore, alabastrorum perulis brevioribus angustioribus, calycis lobis eciliatis vel ad apicem pilis paucis praeditis, corolla breviora tenui haud succulenta extus glabra recedens.

Yunnan. Mountains of the Chungtien plateau. Alt. 12,000–13,000 ft. Lat. 27° 35' N. Shrub of 3–5 ft. Flowers white. Foliage aromatic. Open cliffs and amongst boulders. G. Forrest. No. 10,652. July 1913.

This Chungtien plant is a near ally of *Rh. cephalanthoides*, Balf. f. et W. W. Sm., yet is different. The more close set indumentum on the under-leaf surface is characteristic, and of other distinguishing features the smaller corolla of thin texture and glabrous outside is easily observed.

See also p. 315.

**Rhododendron adenophorum**, Balf. f. et W. W. Sm.

Frutex ad 2.5 m. altus. Rami juveniles circ. 5 mm. diam. tomento lanato denso ochraceo glandulisque clavatis rubiginosis intermixtis obsiti vetustiores tomenti vestigiis griseis glandulisque verruculosis nigrescentibus notati. Alabastrorum oblongorum fulvidorum perulae glandulis plus minusve obiectae ciliatae viscidae gradatim ab externis parvis ovatis carinatis coriaceis breviter apiculatis per intermedias subrotundatas ad internas subspathulatas elongatas submembranaceas mutantes. Folia petiolata ad 13 cm. longa; lamina ad 10 cm. longa ad 4 cm. lata crasse coriacea lanceolata vel late lanceolata vel oblonga breviter acuminata margine paullo revoluta basi cordulata juvenilis utrinque flavido-lanato-tomentosa adulta supra atroviridis costae mediae sulco profundo tomento glandulisque obducto nervis primariis vix impressis caeteroquin reticulato-areolata areolis convexis glandulis stipitatis brevibus vel longioribus plus minusve vestita et nitenti-viscidula subtus cinnamomea vel fulva costa media prominula venis primariis occultis ubique pilorum longorum fasciatim a basi communi orientium ramosorum curvatorum strato uniformi haud scintillante crasso tomentoso lanato obiecta; petiolus circ. 2 cm. longus laminae more tomentosus glandulosusque. Flores plures umbellam laxam formantes; bracteae rufo-glanduloso-tomentosae; pedicelli ad 2 cm. longi dense glanduloso- et rufo-tomentosi sub fructu vix elongati. Calyx fere ad basim 5-lobatus lobis circ. 1 cm. longis 5 mm. latis oblongo-ellipticis submembranaceis glandulosus. Corolla rosea infundibuliformis circ. 3.5 cm. longa, tubo circ. 2.5 cm. longo intus glanduloso-puberulo, lobis 5 rotundatis emarginatis. Stamina 10 corolla breviora filamentis basim versus glandulosus. Ovarium glandulis clavatis dense obiectum viscidissimum; stylus corolla staminibusque vix longior in triente infimo glandulosus; stigma expansum lobatum. Capsula recta circ. 2 cm. longa 0.75 mm. lata nigra glandularum vestigiis verruculosa.

Species in serie *Rh. adenogyni*, Diels ramis petiolisque tomentoso-glandulosus, indumenti forma distinguenda.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 12,000 ft. Shrub of 4-6 ft. Flowers? On rocks and stony pasture. G. Forrest. No. 10,429. July 1913.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 12,000 ft. Shrub of 4-8 ft. Flowers rose, with very few markings. Open situations on pasture and ledges of limestone cliffs. G. Forrest. No. 10,649. July 1913.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 12,000 ft. Shrub of 6-8 ft. Flowers rose. Open

situations on the margins of pine forests. G. Forrest. No. 12,713. July 1914.

*Rh. adenogynum*, Diels was the species first described of an aggregate of forms characterised by a thick buff-coloured or rufous uniform mat tomentum on the under side of the leaves, by a calyx with relatively large lobes—about 1 cm. long—and by an ovary and style bearing clavate glands. It may be taken as the central form. *Rh. adenophorum*, here described as a member of the aggregate, is distinguished by the viscosity of its buds, by the admixture of clavate red glands with tomentum on the young shoots and leaf petioles, by the long glands scattered over the upper leaf-surface, by the long-stalked glands upon the flower pedicels.

***Rhododendron agapetum*, Balf. f. et Ward.**

Arbor parva ad 6 m. alta ramis contortis nudis. Ramuli annotini nigricantes setulis glandulosis et pilis stipitatis apice radiatim ramosis obtecti, vetustiores sordide cinerei esetulosi epilosi decorticantes. Folia petiolata ad 20 cm. longa; lamina crasse coriacea oblonga ad 15 cm. longa ad 5.5 cm. lata apice obtusa tuberculata margine cartilaginea translucens esetulosa (in juventute dense setulosa) obscure undulata basi obtusa matura supra atro-viridis costa media sulcata caeteroquin laevis pilorum juvenilium vestigiis plus minusve conspersa subtus pallidior fulva pilis laxe ramosissimis dendriformibus primo ubique dense tomentosa deinde plus minusve glabrescens pilis floccosim deciduis costa media elevata erubescens venis primariis utrinsecus circ. 18 paullo elevatis erubescens caeteroquin laevis venis ultimis areolato-reticulata et pilorum delapsorum vestigiis minute punctulata; petiolus circ. 3 cm. longus setulis pilisque plus minusve indutus glabrescens. Flores (circ. 10) racemoso-umbellati rhachi setulosa et pilosa; bractee mox deciduae; pedicelli circ. 1.3 cm. longi dense breviterque glanduloso-setulosi. Calyx subobsoletus cupuliformis margine undulatus extus margineque dense breviter glanduloso-setulosus. Corolla coccinea circ. 4.5 cm. longa infundibuliformis extus intusque glabra sursum ampliata in lobos 5 orbiculares circ. 1.6 cm. diam. margine subcrenulatos divisa. Stamina 10 inaequalia majora tubo corollino paullo longiora filamentis deorsum complanatis dilatatis per dimidium inferum puberulis glandulosisque antheris nigro-purpureis circ. 3 mm. longis. Ovarium lobatum conoideum dense glanduloso-setulosum et pilis subdendriformibus praeditum circ. 7 mm. longum basi dense pubescens; stylus staminibus paullo longior corollam subaequans basi glanduloso-setulosus et pilis paucis stipitatis

radiatim ramosis conspersus ad apicem expansus et stigmatibus lobato coronatus.

Species ad seriem *Rh. barbati*, Hook. f. pertinens foliis subtus pilis ramosis floccosim detersilibus praeditis, calyce subobsoletis, staminum filamentis puberulis, ovario styloque setuloso et piloso distinguenda.

E. Upper Burma. Hpimaw. Scraggy tree of 15–20 ft. On steep limestone cliffs in half shade of gully at 6000–7000 ft. Flowers crimson scarlet. F. Kingdon Ward. No. 1851. 31st July 1914.

A species of the *Barbatum* series, and from Kingdon Ward's description of the flower-colour a desirable one for cultivation. The plant finds its nearest ally apparently in *Rh. Smithii*, Nutt., a Bhutan species introduced by Mr. Booth which flowered in Britain in 1859 for the first time. This *Rh. Smithii* is quite a good species and is figured in the Bot. Magazine for 1859, t. 5120. It is one of the most frequent plants met with in gardens under the name *Rh. barbatum*, Wall. Mr. C. B. Clarke\* placed *Rh. Smithii* as a variety of *Rh. barbatum*. That he went so far as to allow to the plant this varietal rank whilst sinking in *Rh. barbatum* the *Rh. lancifolium*, Hook. f. goes far to confirm its specific distinctness. Ward's plant has the characteristic dendroid hairs of the tomentum of the *Barbatum* series, and they fall from the leaf under-surface after the fashion of those in *Rh. Smithii*. To be sure the flower pedicels are much longer than in *Rh. Smithii* and the flowers are larger than in any Himalayan form of the series, but the plant is a good member of this alliance, and has the special interest from the standpoint of geographical distribution that it adds to the considerable body of evidence that is now accumulating which shows that the connection of the flora of East Upper Burma and South-West Yunnan with that of the Eastern Himalaya is closer than with the flora of North-West Yunnan and Szechwan. Of West Chinese species *Rh. habrotrichum*, Balf. f. et W. W. Sm. is the nearest known ally of *Rh. agapetum*.

### ***Rhododendron argipeplum*, Balf. f. et Cooper.**

Frutex circ. 2 m. altus. Ramuli hornotini pallide virides setis atro-purpureis ad 8 mm. longis eglandulosis intertextis glandulisque intermediis brevibus praediti vetustiores gradatim glabrescentes deinde cinerei decorticantes. Alabastrorum perulae fulvidae rotundatae vel late ovatae crustaceae saepe emarginatae circ. 8 mm. longae annos plures persistentes extus viscidae. Folia ad 14 cm. longa petiolata; lamina oblonga ad 12 cm. longa ad 5.5 cm. lata apice abrupte acuminata tuberculo corneo terminata

\* Clarke in Flor. Brit. Ind. iii (1882), 469.



margine cartilaginea pedibus setarum delapsarum asperata basi angustata cordulata lobis subrotundatis supra viridis (costa media venisque primariis utrinsecus circa 14 sulcatis setulis pilisque plus minusve indutis caeteroquin venarum reti occulto) pilorum vestigiis sparse conspersa subtus dense albedo-tomentosa indumenti pilis longe tenuiter stipitatis ramos delicatissimos vesiculosos plurimos patentes intricatim intertextos ad apicem gerentibus et stratum folii paginam venarum reti elevato cinnamomeo notatam obtegens facientibus; petiolus dense longeque strigillosus circ. 1.5 cm. longus. Flores ad 10 in umbellam racemose dispositi; bractee externae ovato-rotundatae crustaceae viscidiae fertiles oblongo-spathulatae circ. 1.5 cm. longae extus et intus apicem versus sericeae; prophylla linearia circ. 7 mm. longa sericea; pedicelli erubescens circ. 8 mm. longi breviter glanduloso-setulosi. Calyx poculiformis circ. 5 mm. longus ultra medium fissus cupula brevissima glanduloso-setulosa lobis 5 late ovatis vel subrotundatis obtusis extus glabris vel hinc et illinc rubro-glanduloso-setulosi. Corolla circ. 3.5 cm. longa infundibuliformis extus plus minusve puberula supra in limbum 5-lobatum ampliata lobis inaequalibus rotundatis emarginatis maximo circ. 1 cm. longo circ. 1.7 cm. lato. Stamina 10 inaequalia longissima circ. 2.3 cm. longa filamentis glabris antheris subglobosis circ. 2 mm. longis. Ovarium glanduloso-setulosum stylo glabro. Capsula paullo curvata ex apice pedicelli oblique oriens dense glanduloso-setulosa circ. 2 cm. longa 5 mm. lata. Semina oblonga circ. 2 mm. longa complanata ad extremitates carnosio-carunculata ala laterali praedita.

Species strigillosa ex affinitate *Rh. Smithii*, Nutt. folii indumento albedo-persistente distinguenda.

Bhutan. Pumthang. 6' bush under *Abies*. Flowers dried. White lining under leaf. Alt. 11,000. R. E. Cooper. No. 4115. 5th July 1915.

The young fruiting specimens collected by Mr. Cooper show some dried flowers which have sufficed for the foregoing description, which is incomplete. There is no doubt about the distinctness of the plant as a species. Amongst other strigillose Himalayan *Rhododendrons*—*Rh. barbatum*, Wall., *Rh. lancifolium*, Hook. f., and *Rh. Smithii*, Nutt.—Mr. Cooper's plant finds in *Rh. Smithii* its likeliest form, but the white indumentum is not deciduous in flocks as in that species.

#### ***Rhododendron basilicum*, Balf. f. et W. W. Sm.**

Frutex vel arbuscula ad 9 m. alta. Rami ultimi crassi 1 cm. diam. hornotini dense rufo-tomentosi annotini nigro-grisei tomenti vestigiis obtekti. Alabastrorum globosorum perulae late ovatae acuminatae tomentosae. Folia magna petiolata



ad 25 cm. longa; lamina crasse coriacea ad 22 cm. longa ad 13 cm. lata obovata apice rotundata retusa mucronulata margine vix revoluta basi obtusa haud cordulata supra atro-viridis costa media sulcata venis primariis utrinsecus ad 15 impressis caeteroquin laevis in morem squali corii leviter rugulosa et glabra sed tamen hic illic vestigiis tomenti juvenilis notata infra costa media venisque primariis elevatis ubique indumento duplice vestita superstrato uniformi cinnamomeo subporriginoso haud scintillante e squamulis pluricellularibus stipitatis infundibuliformibus (?) fimbriatis constructo substrato albedo scintillante floccifero e pilis latis brevibus vacuis vesiculosus; petiolus ad 3.5 cm. longus validus purpureo-niger porriginosus. Inflorescentia magna racemoso-corymbosa 25-flora rhachi cinnamomeo-tomentosa; bractee fertiles oblongae mucronulatae ad 3.5 cm. longae 1 cm. latae extus et superne intus sericeae; pedicelli ad 3 cm. longi pallide tomentosi sub calyce oblique expansi eglandulosi. Calyx tomentosus lobis inaequalibus plus minusve triangularibus circ. 3 mm. longis. Corolla late campanulata subobliqua carnosula pallide flava basi rubro-maculata circ. 3.5 cm. longa, tubo circ. 2.5 cm. longo intus glabro lobis rotundatis emarginatis circ. 1.5 cm. longis. Stamina 16 inclusa filamentis vix puberulis. Ovarium ovoideum sursum angustatum sulcatum pilis longis filiformibus tortuosis ferruginosis fasciatis dense tomentosum eglandulosum; stylus glaber staminibus longior corollam subaequans; stigma discoideum lobulatum. Capsula stricta vel leviter curvata ad 2 cm. longa 5 mm. lata dense rufo-tomentosa. Semina spadicea complanata ad 2 mm. longa anguste membranaceo-arillata.

Species magnifica a *Rh. lacteo*, Franch. longe distans, forsan *Rh. fictolacteo*, Balf. f. affinis sed foliorum ovarique indumento, floribus flavis bene distincta.

Yunnan. Shweli-Salween Divide. Lat. 25° 30' N. Alt. 11,000 ft. Shrub of 10-20 ft. Flowers fleshy pale yellow. In *Rhododendron* thickets. G. Forrest. No. 12,078. June 1913.

Yunnan. Western flank of the Shweli-Salween Divide. Lat. 25° 20' N. Alt. 10,000-11,000 ft. Shrub of 20-30 ft. Flowers deep crimson. In *Rhododendron* forest. G. Forrest. No. 8990. August 1910.

A beautiful large-leaved yellow-flowered species with red blotches at the base of the corolla. The general form of the foliage is that of *Rh. fictolacteam*, Balf. f., but the indumentum of the leaves as well as of the ovaries is quite different.

**Rhododendron cephalanthoides**, Balf. f. et W. W. Sm.

*Rh. cephalanthum*, Diels non Franch. in Notes, R.B.G.,  
Edin., vii (1912), 105.

Fruticulus aromaticus parvifolius ad 1.5 m. altus subdichotome et breviter et tortuose ramosus. Ramuli hornotini dense citrino-lepidoti circ. 1 mm. diam. annotini fulvi stipitibus squamarum decapitatarum albido-scabridi deinde nigro-scabridi tandem grisei decorticantes. Alabastrorum parvulorum perulae mox deciduae exteriores ovatae carinatae apiculatae fulvae ad 6 mm. longae dorso lepidotae margine apicem versus minutissime ciliolatae intus adpresso-puberulae interiores membranaceae obovato-spathulatae flavae vix carinatae obtusae margine subsetuloso-ciliatae ad 1 cm. longae 5 mm. latae. Folia petiolata ad 2 cm. longa; lamina crasse coriacea oblonga vel oblongo-elliptica vel elliptica ad 1.8 cm. longa 8 mm. lata apice obtusa breviter vel longe corneo-mucronulata nunc emarginatim recurvata margine revoluta setularum squamarumque pedibus plus minusve punctulata (in juventute setulis sparsis et squamis fimbriata) basi obtusa nec cordulata supra atro-viridis plana (costa media sulcata caeteroquin venarum reti occulto) squamarum peltatarum juvenilium vestigiis siccis subasperata (in juventute squamis citrinis ubique oblecta) infra fulva porriginosa squamis peltatis concoloribus longius et brevius stipitatis ex umbone convexo plus minusve rubescente institaque late fimbriata aedificatis longioribus stratum superum construentibus costa media elevata straminea; petiolus ad 5 mm. longus lepidotus. Flores albi fragrantés in umbellam parvam capituliformem circ. 10-floram rhachi sparsim puberula congesti; bractee steriles coriaceae late ovatae carinatae apiculatae fulvae dorso lepidotae margine praecipue apicem versus sublanatim ciliatae intus puberulae ad 6 mm. longae fertiles submembranaceae obovato-spathulatae vel obovatae circ. 8 cm. longae 5 mm. latae extus lepidotae margine longe ciliatae intus puberulae; prophylla circ. 7 mm. longa 1.5 mm. lata calyce paullo breviora anguste spathulata dorso lepidota margine ad basim lepidota supra breviter ciliata; pedicelli circ. 3 mm. longi sparse lepidoti. Calyx late campanulatus ad 6 mm. longus fere ad basim subaequaliter quinquelobatus lobis ellipticis vel oblongis apice obtusis vel rotundatis sub-erosis et pilis longis contortis plurimis vel paucis ciliatis ad 4 mm. latis viridibus membranaceis dorso lepidotis intus glabris. Corollae carnosulae circ. 1.8 cm. longae obliquae tubus circ. 1 cm. longus extus puberulus intus villosus in limbum parvum antice patentem postice suberectum elongatus lobis 5 subaequalibus imbricatis rotundatis crenulatis circ. 5 mm. diam. Stamina 5 inclusa circ. 6 mm. longa filamentis supra basim incrassatis glabris antheris oblongis circ. 1.5 mm. longis.

Ovarium 5-lobatum conoideum circ. 1.5 mm. longum dense flavido-lepidotum; stylus vix 0.75 mm. longus claviformis stigmatibus 5-lobato coronatus.

Species cum *Rh. cephalantho*, Franch. olim confusa sed valde diversa et notis sequentibus facile distinguenda:—alabastrorum perulis late ovatis obtusis mox deciduis nec acuminatis persistentibus, foliis minoribus, prophyllis bracteisque haud villosis calycem subaequantibus, corollae tubo extus puberulo.

Yunnan. Eastern flank of the Lichiang Range. Alt. 11,000–11,500 ft. Lat. 27° 10' N. Branched shrub of 2–4 ft. Flowers white, fragrant. Dry ledges of limestone cliffs. G. Forrest. No. 2182. May 1906.

Yunnan. Eastern flank of the Lichiang Range. Alt. 11,000–12,000 ft. Lat. 27° 25' N. Shrub of 2–3 ft. Flowers white, foliage fragrant with a resinous odour. Limestone cliffs and humus-covered boulders. G. Forrest. No. 5866. May 1910.

This Lichiang plant in No. 2182 was referred by Diels\* to *Rh. cephalanthum*, Franch. But it is very different from that species. At a glance one notices the absence of the persistent foliage-bud scale-leaves on the branches so characteristic of *Rh. cephalanthum*, and the shape of the scale-leaves broadly ovate blunt with a mucro in *Rh. cephalanthoides* and narrow long sharply pointed in *Rh. cephalanthum* is an obvious diagnostic mark.

*Rh. acraium*, Balf. f. et W. W. Sm. of the Chungtien Plateau (Forrest No. 10,652) is a much nearer ally, but it wants the scabrid branches and has a smaller corolla not puberulous outside.

Forrest has two specimens from the Lichiang Range which resemble closely *Rh. cephalanthoides*, described above, from the Eastern flank of the same range. The labels on Forrest's specimen bear:—

Yunnan. Western flank of the Lichiang Range. Alt. 12,000 ft. Lat. 27° 25' N. Symmetrically shaped shrub of 2–6 ft. Flowers white, foliage aromatic. Amongst rocks on alpine meadows. G. Forrest. No. 5878. June 1910.

Yunnan. Lichiang Range. Alt. 13,000 ft. Lat. 27° 25' N. G. Forrest. No. 10,312. June 1913.

Although the second ticket does not bear "Western flank," Mr. Forrest believes it is from that station. I record this, for the details of structure do not quite conform. There are minor differences in flower structure between Forrest's Nos. 5878, 10,312 and *Rh. cephalanthoides*, but we do not know enough about these plants to enable us to fix specific limits, and may regard them meanwhile as forms of *Rh. cephalanthoides*. The occurrence of allied species showing slight differences is to be

\* Diels in Notes R.B.G., Edin., vii (1912), 165.

expected in the floras of the Eastern and Western flanks of a range like that of the Lichiang corresponding with the drier and wetter climatic conditions of the flanks respectively.

The Szechwan plant named *Rh. cephalanthum*, Franch. by Rehder and Wilson is not Franchet's species. It is nearer to *Rh. cephalanthoides* and *Rh. acraium*. *Rh. cephalanthum* is a Yunnan plant restricted as we know it to the Tali Range.

See also p. 316.

***Rhododendron chamaetortum*, Balf. f. et Ward.**

Suffrutex nanus ramosissimus late patens ad 15 cm. altus parvifolius. Ramuli breves annotini fusco-rufi squamis peltatis rubiginosis longe breviterque stipitatis dense obtecti nunc stipitibus squamarum longarum decapitatarum setuloso-pubescentes vetustiores grisei (fungorum mycelio nigro plerumque pubescentes) mox decorticantes. Alabastrorum elongatorum acutorum perulae angustae a basi lanceolatae acutae vel acuminate nervo medio carinatae fusco-rufae lepidotae eciliatae serius lignescentes per annos plures persistentes. Folia crasse coriacea breviter petiolata ad 2 cm. longa; lamina ad 1.6 cm. longa ad 8 mm. lata oblonga vel elliptico-oblonga apice obtusa corneo-mucronulata nunc emarginato-recurvata margine paullo revoluta integra basi obtusa vel late cuneata supra atro-viridis squamarum peltatarum vestigiis conspersis subasperata costa media paullo sulcata caeteroquin leviter rugulosa subtus ferruginea indumento squamarum peltatarum bistrato praedita strati superi squamis stipite longo institaque lata strati inferi stipite brevi institaque angusta praeditis costa media pallida basim versus sparsim lepidota prominula; petiolus ad 3 mm. longus lepidotus. Flores pallide rosei plures (circ. 8) ad extremitates ramulorum racemoso-capitatum aggregatae rhachi puberula; bractae externae coriaceae ovatae parvae circ. 5 mm. longae breviter acuminatae carinatae dorso lepidotae margine delicatim ciliatae interiores obovatae obtusae cucullatae extus molliter puberulae vix lepidotae margine pilis contortis ciliatae circ. 6 mm. longae 4 mm. latae saepe ad apicem rubidae; prophylla ramentacea pallide brunnea spathulata circ. 7 mm. longa 1.5 mm. lata calyce breviora dorso puberula sparse lepidota margine lanato-ciliata; pedicelli inaequales supremi ad 5.5 mm. longi puberuli et lepidoti. Calyx rubidus fere ad basim in lobos 5 fissus cupula extus puberula lobis tenuiter membranaceis extus intusque glabris vel luteo-lepidotis margine flavido-lepidotis pilis paucis nunc ciliatis inaequalibus lobo antico minimo circ. 4 mm. longo 2 mm. lato oblongo lobis postero-lateralibus maximis saepe connatis ad 5 mm. longis. Corollae obliquae circ. 1.2 cm. longae tubus ab axe curvatus

antice circ. 5 mm. longus extus glaber intus praecipue ad faucem villosulus, limbi explanati lobi rotundati vel orbiculares circ. 6 mm. diam. minute crenulati. Stamina 5 tubum corollinum antice subaequantia circ. 5 mm. longa filamentis deorsum dilatatis glabris, antheris oblongis aurantiacis. Ovarium circ. 1.5. mm. longum ovoideum 5-lobatum plus minusve lepidotum viscidum; stylus porphyreus ovarium subaequans glaber sursum clavatim dilatatus et stigmatibus 5-lobato coronatus.

Species alabastrorum perulis persistentibus, inflorescentiae rhachi puberula, pedicellis puberulis et lepidotis, corolla pallide rosea, staminum filamentis glabris notisque aliis facile recognoscenda.

Tibeto-Yunnan frontier. Ka-gwr-pw glacier valley. 15,000 ft. Dwarf, forming carpet 6 ins. high. Flowers pink. F. Kingdon Ward. No. 431. June 1913.

This delightful alpine shrub belongs to the *Cephalanthum* series. Its dense trusses of pink flowers evidently produced in numbers upon the close carpet of green vegetative shoots must be a pleasing sight, and one hopes that Mr. Ward may have obtained seed of the plant. In the series of which *Rh. cephalanthum*, Franch. as the oldest described species is the centre there is no species for which *Rh. chamaetortum* can be mistaken. The indumentum of the leaf under-surface is marked by the compactness of the upper stratum of disks of the peltate scales, and these are broad and show clearly their structure to superficial examination. The colour of indumentum recalls *Rh. gymnomiscum*, Balf. f. et Ward and *Rh. mwaiense*, Balf. f. et Ward, both of which are yellow-flowered species.

See also p. 315.

### *Rhododendron chryseum*, Balf. f. et Ward.

Suffrutex nanus parvifolius ramosissimus. Ramuli annotini circ. 1 mm. diam. squamis sanguineo-rufis dense furfuracei vetustiores mox glabrescentes cinerei decorticantes. Alabastrorum parvorum oblongo-fusiformium perulae parvae extus rufae lepidotae intus stramineae acutae eciliatae. Folia crasse coriacea ad 1.5 cm. longa breviter petiolata; lamina oblonga vel subobovata ad 1.3 cm. longa 5 mm. lata rotundata apice integra vel emarginata mucronulata margine integra leviter recurvata basi cuneata supra atro-viridis squamis peltatis impressis sucinonitentibus contiguis uniformiter induta costa media sulcata caeteroquin plana, subtus pallidior squamis rufescentibus et pallide viridibus intermixtis fere contiguis vestita intervallis minutis glaucis costa media paullo elevata squamosa venarum reti ultimo occulto; petiolus ad 3 mm. longus lepidotus. Flores aurei in umbellas subsessiles ad 6-floras terminales aggregati



rhachi lepidota; bracteae fulvae late ovatae vel subrotundatae ad 6 mm. longae apiculatae margine breviter ciliatae dorso lepidotae mox deciduae; prophylla ramentacea lineari-claviformia ad 5 mm. longa eciliata vel ad apicem parce ciliata calyce breviora; pedicelli ad 5 mm. longi dense furfuraceo-lepidoti. Calyx circ. 4 mm. longus in lobos 5 inaequales fere ad basim fissus viridis cupula dense lepidota et saepe erubescens lobis oblongis vel ovatis vel ellipticis apice acutis vel obtusis vel rotundatis et erosis saepe per paria connatis dorso dense lepidotis intus puberulis margine lepidoto-fimbriatis et praecipue apicem versus sparsim setulosis. Corolla aurea ad 1.3 cm. longa tubo brevi circ. 2.5 mm. longo extus glabro intus praecipue ad faucem albo-villosulo in limbum late infundibuliformem 5-lobatum ampliato lobis oblongis circ. 1 cm. longis circ. 6 mm. latis dorso nitenti-lepidotis margine minute crenulato-denticulatis. Stamina 5 corollam subaequantia filamentis validis intra tubum corollinum complanatis et supra basim floccoso-villosulis superne glabris fulvis antheris fuscis. Ovarium subconicoideum lobatum circ. 2 mm. longum squamis viscidis lepidotum; stylus exsertus stamina breviter superans validus basi plus minusve puberulus; stigma discoideum lobulatum.

Species *Rh. flavido*, Franch. valde affinis indumento densiore, inflorescentia ad 6-flora, corolla extus densius lepidota, staminibus 5, stylo stamina aequante basi puberulo facile distinguenda.

Tibeto-Yunnan frontier. Ka-gwr-pw glacier valley. 13,000–15,000 ft. Dwarf. Yellow. F. Kingdon Ward. No. 540. June 1912; 13,000–14,000 ft. Dwarf. Granite screes. F. Kingdon Ward. No. 577. 27th June 1913.

A species of the Lapponicum series. This the Yunnan form of the Szechwan *Rh. flavidum*, Franch. is readily distinguishable from that species. The indumentum of the under side of the leaf has many more scales which are set much closer upon the greyish surface, and the scales are bicolor, about one-half dark brown, one-half pale green, equally intermixed; the inflorescence is larger and so are the flowers; the corolla is copiously lepidote outside, not sparingly so or not at all as in *Rh. flavidum*, and then there are only 5 stamens—apparently constantly. The style is shorter and is puberulous at the base. Rehder and Wilson describe *Rh. flavidum*, Franch. var. *psilostylum*, which they separate from *Rh. flavidum*, Franch. by its duller green leaves, lepidote flowers, smaller calyx, glabrous style, smaller and more globose fruits. Ward's plant is not this variety, two of the given characters of which seem not valid—the lepidote flower and the glabrous style—both of these I find in Franchet's type.

See also p. 299.



**Rhododendron clivicolum**, Balf. f. et W. W. Sm.

Frutex aromaticus parvifolius ad 1.5 m. altus ramosissimus saepe virgatus. Ramuli hornotini flavido-lepidoti subviscidi annotini circ. 2 mm. diam. fulvi indumento compacto e squamis peltatis stipitatis et stipitibus setulosis squamarum decapitatarum constructo obiecti vetustiores cinerei decorticantes. Alabastro-  
rum parvorum oblongorum perulae deciduae paucae externae fuscae ovatae vel ellipticae coriaceae extus lepidotae margine minutissime ciliatae circ. 3 mm. longae interiores membranaceae spathulatae circ. 7 mm. longae 3 mm. latae extus dense lepidotae et puberulae superne ciliatae. Folia crasse coriacea ad 3 cm. longa petiolata; lamina oblonga vel elliptico-oblonga vel elliptica ad 2.5. cm. longa ad 1 cm. lata mucronulata margine asperata basi obtusa vel late subcuneata supra atro-viridis squamarum juvenilium vestigiis minutis pulverulenta costa media sulcata caeteroquin paullo reticulatim rugulosa subtus spadiceo-brunnea squamis peltatis contiguis parvis breviter stipitatis partim fuscis partim albidis uniformiter induta sed hic et illic squama singula majore intensius colorata subpunctulata costa media elevata primo omnino lepidota deinde plus minusve nuda straminea sparsim lepidota venis primariis plus minusve visibilibus; lamina juvenilis utrinque flavido-lepidota subtus intensius et squamis magnis paucis viridibus conspersa margine sparse setulosa copiose lepidota; petiolus circ. 5 mm. longus fusco-lepidotus. Flores tubo luteo limbo albo in umbellas capituliformes terminales racemose aggregati inflorescentiae rhachi puberula; bractee mox deciduae; prophylla ramentacea subspathulata ad 8 mm. longa ad 2 mm. lata calycem aequantia ubique puberula dorso lepidota margine ciliata; pedicelli squamis magnis paucis lepidoti circ. 4 mm. longi saepe purpurascens. Calyx ad 4 mm. longus fere ad basim fissus viridis nunc purpurascens cupula glabra lobis inaequalibus imbricatis foliaceis haud tenuiter membranaceis opacis ovatis vel oblongis vel ellipticis apice acutis vel obtusis vel subrotundatis vel truncatis nunc subfimbriatim erosis dorso squamulis latis ubique lepidotis margine pilis longis tortuosis ciliatis, post anthesin auctis ad 6 mm. longis. Corollae circ. 1.8 cm. longae extus omnino glabrae subobliquae tubus longus antice 1 cm. longus intus villosulus subcylindricus sursum paullo amplius et in lobos 5 rotundatos integros circ. 6 mm. diam. expansus. Stamina 5 circ. 5 mm. longa filamentis deorsum dilatatis basim versus puberulis, antheris oblongis 1 mm. longis. Ovarium circ. 1.5 mm. longum lobatum dense flavido-lepidotum; stylus circ. 0.75 mm. longus validus clavatus ruber stigmatibus lobato coronatus.

Species *Rh. anthopogonoidi*, Maxim. valde affinis sed foliis minoribus calyce lepidoto corolla multo longiore diversa.

Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 11,000–12,000 ft. Lat.  $27^{\circ} 45' N$ . Shrub of 3–5 ft. Foliage aromatic. Flowers white tube yellow. On ledges of limestone cliffs and rocky slopes. G. Forrest. No. 10,585. July 1913.

A species not far removed from *Rh. anthopogonoides*, Maxim. but with smaller leaves and larger flowers, while the calyx in the two species is very different. In *Rh. clivicolum* the lobes are green, foliaceous not translucent, with large lepidote scales on the back and apparently increasing much in size after flowering is over. In *Rh. anthopogonoides* the calyx lobes are membranous translucent and elepidote outside. *Rh. crennophilum*, Balf. f. et W. W. Sm. is also an ally, being one of the *Fragrans* series, but its smaller elliptic leaves and rose-coloured flowers separate it.

See also p. 293.

***Rhododendron complexum*, Balf. f. et W. W. Sm.**

Suffrutex parvifolius intricatim ramosissimus. Ramuli annui breves circ. 1.5 cm. longi hornotini ferrugineo-lepidoti seniores nigricantes demum decorticantes. Alabastra parvula circ. 2 mm. longa oblonga extus perulis paucis ferrugineo-lepidotis crassis vestita. Folia crasse coriacea petiolata ad 1 cm. longa; lamina elliptica vel oblongo-elliptica ad 8.5 mm. longa ad 4.5 mm. lata obtusa minute mucronulata margine vix revoluta basi rotundata vel obtusa vel late cuneata supra atro-viridis canescens squamis peltatis uniformibus fere contiguis persistentibus adpressis (umbone depresso plus minusve flavescente instita lata albida) induta subtus ferruginea subnitens squamis uniformibus discontiguis persistentibus in foveolas immersis umbone plus minusve resinoso-rubro institaque spadicea praedita intervallis esquamosis pallide viridibus papillis epidermicis ceriferis notatis; petiolus circ. 1.5 mm. longus ferrugineo-lepidotus. Flores in umbellas congestas 3-floras terminales conferti; bractee steriles exteriores rotundatae crustaceae brunneae in dorso medio lepidotae margine albo-ciliatae fertiles membranaceae verruculosae subspathulatae apicem versus lanato-ciliatae; pedicelli vix 1 mm. longi lepidoti. Calyx minutus cupula dense lepidota purpurea lobis 5 inaequalibus vel aequalibus duobus postero-lateralibus maximis ovatis vel rotundatis circ. 1 mm. longis dorso lepidotis vel elepidotis plus minusve lanato-ciliatis purpureis. Corolla 1.2 cm. longa violacea extus elepidota a basi infundibuliformis tubo circ. 6 mm. longo intus supra ovarium pubescente sursum in limbum disco concavo ampliatis expanso lobis circ. 7 mm. longis oblongo-ellipticis undulatis. Stamina 5 stylo duplo longiora filamentis corollae tubum vix excedentibus supra basim latam puberulis antheris

parvis ad basim loborum corollae exsertis. Ovarium in triente inferiore laete viride et pilis paucis vestitum supra dense lepidotum; stylus brevis ovario paullo longior staminibus multo brevior purpureus glaber; stigma atro-purpureum lobulatum. Capsula circ. 3 mm. longa rufo-brunnea basi calyce inclusa lepidota ab apice ad basim valvis 5 dehiscens.

Species *Rh. intricato*, Franch. similis sed foliis subtus ferrugineis squamis discontiguis uniformibus corollaque extus lepidota notata.

Yunnan. Open stony pasture on the Chungtien plateau. Lat. 27° 30' N. Alt. 11,000–12,000 ft. Matted shrub of 1–2 ft. Flowers deep rose purple. G. Forrest. No. 12,520. June 1914.

An interesting species which shows us a stage somewhat intermediate between the Lapponicum series and the Fragens and the Cephalanthum series. *Rh. complexum* by habit and indumentum is one of the set within the Lapponicum series which have truly discontinuous under-leaf indumentum with brown impressed scales on a mat green ground, while the leaves are small, dark green above, such as we find in *Rh. impeditum*, Balf. f. et W. W. Sm. and in *Rh. scintillans*, Balf. f. et W. W. Sm. But in flower it differs. The corolla tube is here elongated, much ventricose at base, and the limb spreads out from it often nearly flat. Within the long tube the stamens and style are concealed. The anthers just reach to the mouth of the tube. The style is much shorter than the stamens and only a little longer than the ovary. The whole flower construction recalls *Rh. intricatum*, Franch. where we find precisely the same relationships, but in vegetative features *Rh. intricatum* is very different from *Rh. complexum*. Its under-leaf indumentum is shining grey or yellowish grey with contiguous scales, and the upper leaf surface, owing to the scale vestiges, is somewhat hoary. The divergence of flower character of which I speak has therefore taken place more than once in the phyletic history of the series. I have preferred to retain *Rh. complexum* as well as *Rh. intricatum* in the Lapponicum series. Although they have a corolla so different from that in the rest of the series it never develops the copious beard of the Fragens series and Cephalanthum series. And then the under-leaf indumentum of *Rh. complexum* is unknown in these other series, nor, indeed, is that of *Rh. intricatum* found there although the resemblances are greater in its case.

See also p. 299.

### *Rhododendron cremnophilum*, Balf. f. et W. W. Sm.

Suffrutex pumilus ad 6 dm. altus parvifolius tortuose ramosus. Ramuli annui brevissimi circ. 5 mm. longi hornotini squamis peltatis stipitatis citrinis lepidoti biennes fulvi triennes squamis

siccescentibus nigricantibus stipite conspicuo induti deinde grisei squamarum decapitatarum stipitibus scabrido-setulosi decortican-tes. Alabastrorum oblongorum acutiusculorum perulae mox deciduae externae ellipticae vel late ovatae vel ovato-rotundatae circ. 3 mm. longae 2.5 mm. latae vix carinatae coriaceae fulvae extus lepidotae margine minutissime ciliatae intus puberulae interiores subspathulatae vel obovato-spathulatae membranaceae nervo medio prominulo obtusae ad 8 mm. longae 4 mm. latae stramineae basi sucino-coloratae extus lepidotae margine longe ciliatae intus puberulae. Folia ad 1.5 cm. longa breviter petiolata; lamina crasse coriacea elliptica vel oblongo-elliptica ad 1.2 cm. longa 9 mm. lata apice corneo-mucronulata saepe recurvata margine paullo revoluta squamis peltatis vel squamarum stipitibus vel setularum juvenilium pedibus asperata nunc sparsissime setulosa (in juventute semper setulosa) basi obtusa vel subrotundata supra atro-viridis rugulosa squamarum delapsarum vestigiis obscuris exasperata (in juventute citrino-lepidota) costa media sulcata subtus flavido-fulva compacto-lepidota squamis peltatis contiguis persistentibus ex umbone convexulo pallide fuscescente institaque leviter fimbriata angusta vix umbonem aequante aedificatis paucis longius stipitatis sed indumenti superficie fere uniformi (in juventute dense citrino-lepidota) costa media elevata laxe lepidota; petiolus ad 4 mm. longus plus minusve glaber nunc purpurascens. Flores pallide rosei in umbellam terminalem ad 10-floram capituliformem rhachi puberula racemose congesti; bracteae mox deciduae exteriores coriaceae ovatae vel rotundatae spadiceo-brunneae extus lepidotae margine minute ciliatae intus puberulae interiores fertiles membranaceae flavae basi sucino-coloratae obovatae apice rotundatae nunc rubidae extus nitenti-lepidotae et puberulae margine pilis tortuosis longe ciliatae intus puberulae ad 8 mm. longae 4 mm. latae; prophylla circ. 6 mm. longa calyce longiora anguste spathulata uninervia ramentacea dorso lepidota margine longe ciliata; pedicelli breves circ. 2 mm. longi lepidoti. Calyx circ. 4 mm. longus ad basim fissus viridis nunc rubidus lobis imbricatis subaequalibus oblongis circ. 2 mm. latis apice sub-erosis truncatis margine ipso ciliato extus lepidotis intus glabris. Corollae circ. 1 cm. longae pallide roseae tubus basi cylindricus sursum oblique amplius infundibuliformis extus glaber intus dense villosus circ. 8 mm. longus, limbi patuli subrepandi discus circ. 0.5 mm. latus, lobi subrotundati saepe subirregulares (posticus maximus circ. 4 mm. diam.) margine inaequaliter crenulati. Stamina plerumque 5 filamentis deorsum paullo expansis infra minute puberulis circ. 5 mm. longis, antheris ovoideis circ. 0.5 mm. longis. Ovarium circ. 1.5 mm. longum 5-lobatum squamulis contiguis parvis lepidotum; stylus rubidus

ovario brevior circ. 1 mm. longus glaber sub stigmatibus clavatus ; stigma planum 5-lobatum.

Species ex affinitate *Rh. anthopogonoidis*, Maxim. sed foliis minoribus ad 1.5 cm. longis, bracteis interioribus lepidotis et puberulis haud sericeis, calyce minore lepidoto, corolla rosea haud flava recedens.

Yunnan. Mountains of the Chungtien plateau. Alt. 13,000 ft. Lat. 27° 30' N. Matted shrub of 2 ft. Flowers pale rose. Ledges of cliffs and boulders. G. Forrest. No. 12,631. July 1914.

A dwarf species this, belonging to a small series including *Rh. anthopogonoides*, Maxim., *Rh. clivicolum*, Balf. f. et W. W. Sm., *Rh. fragrans*, Maxim. and *Rh. primulaeflorum*, Franch. They resemble both the *Cephalanthum* series and the *Anthopogon* series in many characters, but they have not the loose indumentum of *Cephalanthum* nor the rufescent agglutinate indumentum of *Anthopogon*. *Rh. cremnophilum*, is marked out from its fellows by the small elliptic or slightly oblong-elliptic leaves and its short twisted branches, and is in all its parts smaller than either *Rh. anthopogonoides* and *Rh. clivicolum*. Then its flowers are rose coloured, as they are in *Rh. fragrans*. I may add that the cuticle on the epidermal cells is very thick, exceeding the lumen of the cells, and the epidermal papillae are conoid or even ovoid and set very close together.

See also p. 293.

***Rhododendron diacritum*, Balf. f. et W. W. Sm.**

Suffruticosum nanum ad 5 dm. altum intricatim ramosissimum haud virgatum. Ramuli hornotini squamis ferrugineis dense laete porriginosis seniores squamarum reliquiis verruculosi deinde sordide grisei mox decorticantes. Alabastrorum parvulorum circ. 2 mm. longorum oblongo-ovoideorum perulae paucae ovatae crassiusculae ferrugineae lepidotae. Folia crassa coriacea parva petiolata ; lamina elliptica vel oblongo-elliptica ad 8 mm. longa 5 mm. lata plerumque minor apice obtusa vel rotundata obscure mucronulata margine leviter recurva et undulata basi obtusa vel late cuneata vel subrotundata supra griseo-viridis squamis albidis peltatis uniformibus contiguis persistentibus umbone nunc flavido-nitente lepidota costa media vix manifesta subtus alutacea squamis peltatis contiguis biformibus omnino induta (squamarum plerisque adpressis ex umbone flavido-nitido institaque albida constructis caeteris paucioribus majoribus stipite longiore et umbone institaque rufescenti-nitida superficiem punctulis notantibus) costa media vix elevata venis primariis occultis ; petiolus circ. 2 mm. longus crassus rufo-squamulosus. Flores parvi solitarii terminales ;



bracteae steriles pallide brunneae ovatae acutae fertiles oblongae cucullatae obtusae mucronulatae circ. 3.5 mm. longae dorso lepidotae apice delicate ciliatae; bracteolae ligulatae membranaceae apice extus lepidotae sursum haud expansae calyce dimidio longiores; pedicelli circ. 1 mm. longi albido-lepidoti sub calyce paullo dilatati. Calyx circ. 1.5 mm. longus pallide viridis extus ex toto dense albido-lepidotus in lobos 5 crassiusculos inaequales maximum circ. 1 mm. longum et latum margine lanato-ciliatos fissus. Corollae roseo-purpureae fauce albo circ. 1 cm. longae tubus latus brevis circ. 1.5 mm. longus basi paullo gibbosus intus ad faucem leviter puberulus sursum in limbum brevem concavum expansus, lobi 5 oblongi circ. 3 mm. longi extus conspicue albo-lepidoti. Stamina 10 subaequalia corollam aequantia filamentis pallide roseis supra basim dense villosis faucem corollae occludentibus antheris roseo-purpureis. Ovarium pallide viride albido-lepidotum; stylus tenuis roseo-purpureus glaber corolla staminibusque multo longior; stigma parvum lobulatum. Capsula grisea lepidota circ. 4 mm. longa ad basim 5-valvata.

Species fastigiata *Rh. drumonio*, Balf. f. et Ward et *Rh. telmateio*, Balf. f. et W. W. Sm. affinis squamis subfoliaribus punctulatis, foliis oblongis subtus ravis, floribus parvis solitariis roseo-purpureis, calyce parvo, corollae tubo brevi ad faucem puberulo lobisque extus dense lepidotis, staminibus 10 corollam aequantibus, filamentis villosis, stylo glabro staminibus multo longiore notata.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 13,000–14,000 ft. Matted shrub of 12–20 inches. Flowers deep rose purple, throat white. Open situations on cliffs and humus-covered boulders. G. Forrest. No. 12,614. July 1914.

A bright floriferous species of the Lapponicum series. It is one of the plants which, like *Rh. drumonium*, Balf. f. et Ward and *Rh. telmateium*, Balf. f. et W. W. Sm., has punctulate under-leaf indumentum and also a lepidote corolla. Its floriferousness as seen on dried specimens is remarkable. A small shrublet with very thin erect twigs, it resembles in that both the species named, being likest *Rh. telmateium* in its hoary appearance but differing in its oblong or oblong elliptic not narrowly lanceolate leaves. *Rh. drumonium* is readily separated by its shorter style only about equalling not longer than the stamens.

See also p. 299.

***Rhododendron drumonium*, Balf. f. et Ward.**

Suffrutex nanus ad 30 cm. altus parvifolius in pulvinos aggregatus vel late diffusus quasi ericetum quoddam minutum. Ramuli erecti plurimi annotini circ. 1 mm. diam. dense squamis



rufis furfuracei seniores nigro-verruculosi dein grisei decorticantes. Alabastrorum parvulorum oblongorum perulae paucae extus rufo-lepidotae margine ciliatae vix 1.5 mm. longae. Folia crasse coriacea petiolata ad 1 cm. longa; lamina oblonga vel anguste elliptica apicem basimque versus angustata ad 8 mm. longa ad 3 mm. lata apice mucronulata margine paullo recurvata basi late cuneata et obtusa supra atro-viridis lepidoto-canescens squamis peltatis superficialibus fere contiguis uniformibus ex umbone annulatim flavescenti-nitente et instita lata albida aedificatis subtus alutacea sparsim brunneo-punctata nitens squamis contiguis persistentibus biformibus imbricatim induta plerisque spadiceis umbone depresso sucineo institaeque albida paucioribus majoribus altioribus umbone resinoso-rubro institaeque lata brunnea costa media supra vix conspicua subtus vix elevata venis primariis utrinque occultis; petiolus circ. 1.5 mm. longus rufo-lepidotus. Flores solitarii terminales; bractee paucae externae crustaceae oblongo-ellipticae vel rotundatae cucullatae dorso squamis biformibus mox deciduis rufo-lepidotae margine apicem versus lanato-ciliatae internae subspathulatae pallidae dorso apicem versus lepidotae plus minusve ciliatae; pedicelli circ. 1 mm. longi rufo-lepidoti; bracteolae ligulatae longae pedicellum excedentes. Calyx fere ad basim in lobos 5 aequales oblongos obtusos virides vel purpureos haud membranaceos dorso plus minusve lepidotos margine eciliatos fissus. Corolla purpureo-coerulea fere rotata tubo brevi circ. 2 mm. longo basi subventricoso extus sparsissime puberulo intus ad faucem puberulo neque albo-villoso limbi disco angustissimo lobis patentibus fere planis oblongo-ellipticis circ. 5 mm. longis dorso dense albido-lepidotis. Stamina 8-10 fere aequalia vix corollam aequantia filamentis purpureis pilis paucis aggregatis supra basim planam et ovarium praeditis antheris lateritiis. Ovarium squamis peltatis viridescentibus lepidotum; stylus purpureus glaber staminibus brevior vel aequilongus; stigma atropurpureum lobulatum. Capsula circ. 4.5 mm. longa brunnea albido-lepidota valvis 5 ad basim dehiscens.

Species fastigiata inter seriem squamis subfoliaribus contiguis biformibus punctulatis corollaque extus lepidota notatam *Rh. telmateio*, Balf. f. et W. W. Sm. persimilis sed habitu, floribus parvulis, staminibus styloque subaequalibus diversa.

Yunnan. Valley of Chung River. Alt. 10,500 ft. Dwarf shrub forming carpet or separate tufts 9 ins. to one foot high in open pine forest. F. Kingdon Ward. No. 269a. May 1913.

One of the small number of species in the Lapponicum series of Rhododendrons with contiguous bicolour punctulate scales on the under side of the leaf and with a lepidote corolla. From *Rh. diacritum*, Balf. f. et W. W. Sm. and from *Rh. telmateium*,

Balf. f. et W. W. Sm. it is distinguished by having the style just about the length of the stamens. *Rh. nigropunctatum*, Franch. is a typical member of this punctulate set of species, but it has an elepidote corolla, as has also *Rh. alpicolum*, Rehder and Wilson.

See also p. 299.

***Rhododendron euchroum*, Balf. f. et Ward.**

Frutex nanus procumbens late patens vix ad 6 dm. altus umbraticola. Ramuli annotini circ. 2 mm. diam. floccis et pilis singulis et glandulis stipitatis intermixtis tomentosi vetustiores glabri purpurei mox grisei desquamantes. Alabastrorum parvorum ovoideorum perulae exteriores ovatae acuminatae carinatae circ. 5 mm. longae pilis floccosis dense griseo-vel ex parte rufo-tomentosae. Folia coriacea petiolata ad 8 cm. longa juvenilia ignota; lamina ad 6.5 cm. longa ad 2 cm. lata lanceolata vel oblanceolata apice acuta breviter acuminatim apiculata margine cartilaginea plana basi in petiolum attenuata, supra glabra viridis hic et illic pilorum juvenilium vestigiis et glandulis conspersa costa media anguste et profunde sulcata venis primariis utrinsecus ad 7 obscuris superficie plana subtus costa media a basi elevata et sparsim tomentosa apicem versus tomento occulta superficie caeteroquin (epidermide epapillosa) lana ferruginea scintillante dense vestita indumento bistrato superstrato persistente nunc deterrenti e pilis longe stipitatis ramulis longis erectis unicellularibus vesiculosus plus minusve rufus tortuosus intertextis substrato nunquam deterrenti e pilis breviter stipitatis ramulis horizontaliter patentibus albidis aedificato; petiolus purpureus circ. 1.5 cm. longus pilis longis densis floccosis etiam glandulis rubris paucis vestitus tandem plus minusve nudus. Flores ad 5 in umbellam veram laxè dispositi rhachi inter bracteas glanduloso-tomentosa; bracteae ignotae; pedicelli circ. 1 cm. longi validi pilis longis glandulisque brevibus dense obiecti sub calyce inexpandi. Calyx parvus sine basi cupulari in lobos 5 oblongos dense tomentosos vix 1 mm. longos divisus. Corolla carnosula laete rubro-ochracea tubulosa sursum ampliata limbo 5-lobato campanulato circ. 3 cm. longa extus eglandulosa epilosa basi 5-gibbosa intus glabra basi varis atrorubris saepe pilis glandulosis praeditis notata lobis rotundatis integris circ. 1.2 cm. longis 1 cm. latis. Stamina 10 inaequalia longiora vix corolla breviora filamentis deorsum latioribus et a medio ad basim albo-pubescentibus. Ovarium angustum circ. 5 mm. longum pilis floccosis dense ferrugineo-tomentosum in stylum sursum attenuatum; stylus corollam subaequans basi pilis floccosis plus minusve obiectus; stigma lobatum.

Species *Rh. floccigero*, Franch. affinis foliorum indumento,

corolla minore, staminum filamentis pubescentibus valde diversa.

E. Upper Burma. Nwai Divide. Ridge of Naung-Chaung. Alt. 10,000 ft. Dwarf procumbent shrub of spreading habit on granite ridge, damp shady situations under bamboos. Stem rising  $1\frac{1}{2}$ –2 ft. from ground. Flowers bright brick red. Kingdon Ward. No. 1778. 14th July 1914.

A beautiful species carrying into Burma the group of Rhododendrons with medium-sized succulent bright coloured corollas, to which the Chinese *Rh. floccigerum*, Franch., *Rh. haematodes*, Franch., and others belong.

**Rhododendron glischrum**, Balf. f. et. W. W. Sm.

Arbor parva ad 8 m. alta. Ramuli hornotini flavido-virides dense glanduloso-setulosi glandulis ovoideis nigro-rubris stipite setuloso stramineo vel luteo ad 4.5 mm. longo vel brevi vetustiores flavidi esetulosi. Alabastrorum perulae oblongae obtusae viscidae annos plures plus minusve persistentes. Folia breviter petiolata ad 22 cm. longa; lamina oblanceolata ad 20 cm. longa ad 5 cm. lata apice acuminata tuberculo corneo terminata margine cartilaginea pectinatim glanduloso-setulosa basi late cuneatim attenuata supra olivacea costa media sulcata et praecipue basim versus plus minusve setulosa venis primariis acute adscendentibus utrinsecus circ. 15 subsulcatis caeteroquin areolatim subrugulosa glabrescens sed glandularum setiformium juveniliis vestigiis obscuris plus minusve notata, subtus pallidior subcinnamomea costa media venisque primariis et marginem versus secundariis elevatis ubique setulis longis glandulosis decurvatis dense hispida; petiolus circ. 2 cm. longus glanduloso-setulosus. Flores racemose umbellati inflorescentia circ. 10-flora, rhachi glanduloso-setulosa; bracteae externae ad 5 cm. longae basi parva incrassata vix 4 mm. lata longe et anguste caudatae extus glanduloso-setulosae intus sulcatae glabrae intermediae basi latiore rotundata amplexicauli circ. 1.5 cm. diam. caudam aequante extus plus minusve glanduloso-setulosae intus adpresso-puberulae intimae subspathulatae vel obovatae extus intusque dense sericeae; prophylla vix 1 cm. longa filiformia pubescentia; pedicelli circ. 3.5 cm. longi dense glanduloso-setulosi. Calyx viridis circ. 1.5 cm. longus fere ad basim in lobos 5 fissus cupula extus glanduloso-setulosa lobis aequalibus circ. 8 mm. latis foliaceis oblongis obtusis margine ciliatis intus nitidis apicem versus nunc adpresso-puberulis. Corolla circ. 3 cm. longa infundibuliformis extus intusque glabra in limbum circ. 1 cm. longum expansa lobis 5 rotundatis 2 cm. latis emarginatis. Stamina 10 tubum corollinum aequantia filamentis deorsum dilatatis et basim versus glanduloso-pubescentibus.

tibus antheris 3.5 mm. longis atro-purpureis. Ovarium setulis glandulosis dense albo-setulosum; stylus staminibus paullo longior basi glanduloso-setulosus. Capsula viscida calyce viscido inclusa circ. 1.5 cm. longa 4.5 mm. lata recta calyci obliqua dense glanduloso-setulosa. Semina fusca oblonga complanata ad 2 mm. longa ad extremitates pilis latis punctulatis cristatim carunculata.

Species forsan ex affinitate *Rh. strigilloi*, Franch. foliis oblanceolatis, floribus longe pedicellatis, calyce magno, staminibus pubescentibus, ovario styloque glanduloso-setulosis valde diversa.

Yunnan. Kari Pass, Yangtze-Mekong Divide. Lat. 27° 40' N. Shrub of 25 feet. Flowers? In fruit. Open situations in thickets and pine forests. G. Forrest. No. 12,901. July 1914; No. 13,564. Oct. 1914.

Mr. Forrest's specimens have withered flowers only and there is no record of colour. The description given above of the flower is therefore incomplete. The plant is most distinct as a species.

#### **Rhododendron gymnomiscum, Balf. f. et Ward.**

Frutex aromaticus dumetorum alpinorum erecto-ramosus saepe subvirgatus. Ramuli annotini fulvo-brunnei squamis peltatis stipitatis dense obtecti et stipitibus squamarum decapitatarum plus minusve setulosi indumento annos plures persistente saepe nigricante vetustiores cinerei decorticantes. Alabastrorum parvorum ovoideo-oblongorum perulae mox deciduae paucae oblongae obtusae spadiceo-brunneae dorso lepidotae margine minute ciliatae. Folia crasse coriacea ad 3.5 cm. longa petiolata; lamina oblonga ad 3 cm. longa ad 1 cm. lata apice obtusa vel acutiuscula mucronulata margine paullo revoluta integra squamis asperata basi obtusa vel late subcuneata supra atro-viridis costa media sulcata caeteroquin reticulatim leviter rugulosa et squamarum juvenilium glandulosarum viscidarum vestigiis plus minusve notata subtus primo fulvida ultimo subrufescens superficiem porriginosam planam exhibens indumento vix spongioso e squamis instita angusta et stipite brevi subuniformiter constructo costa media elevata primo squamis occulta deinde flava sparsim rufo-lepidota; lamina juvenilis utrinque plus minusve flava glanduloso-lepidota margineque longe ciliata; petiolus circ. 5 mm. longus fusco-lepidotus. Flores lutei in umbellas terminales ad 7-floras parvas racemose aggregati inflorescentiae rhachi pubescente elepidota; bracteae exteriores late ovatae vel subrotundatae ad 6 mm. longae 5 mm. latae fusco-brunneae dorso lepidotae margine longe ciliatae ecarinatae mucronulatae interiores obovatae vel

subspathulatae membranaceae circ. 8 mm. longae 3 mm. latae dorso lepidotae margine ciliatae intus puberulae; prophylla lineari-claviformia ramentacea extus lepidota margine ciliata circ. 7 mm. longa vix 1 mm. lata calycem aequantia; pedicelli inaequales purpurei glabri circ. 4 mm. longi. Calyx poculiformis fere ad basim 5-lobatus cupula rubida vel subviridi glabra lobis subaequalibus oblongis acutis vel obtusis vel rotundatis nunc subtruncatis membranaceis plus minusve rubidis dorso lepidibus laete viridibus obtectis margine lepidoto-fimbriatis et plus minusve minute ciliatis intus puberulis. Corollae tenuis circ. 1.5 cm. longae paullo obliquae tubus antice circ. 8 mm. longus extus glaber intus villosulus in limbum explanatum 5-lobatum expansus lobis subaequalibus rotundatis integris circ. 5 mm. diam. Stamina ad 6 mm. longa filamentis fragilibus deorsum dilatatis glabris antheris oblongis circ. 1 mm. longis. Ovarium 1.25 mm. longum ovoideum lobatum plus minusve lepidotum subviscidum; stylus circ. 2 mm. longus cylindricus apicem versus expansus ibique stigmatibus lobato coronatus.

Species ex affinitate *Rh. nwaiensis*, Balf. f. et Ward, gregis *Cephalanthi*, alabastrorum perulis mox deciduis, inflorescentiae rhachi pubescente, pedicellis glabris, calycis lobis rubidis viridilepidotis margine lepidoto-fimbriatis, corolla extus glabra, stylo quam ovarium fere duplo longiore notata.

Tibeto-Yunnan frontier. Ka-gwr-pw glacier. Scrub belt. Alt. 14,000 ft. Flowers yellow. Ward. No. 505. June 1913.

A plant of the *Cephalanthum* series; distinguished from most of the series, excepting *Rh. cephalanthum*, Franch. itself and *Rh. platyphyllum*, Balf. f. et W. W. Sm., by the size of the foliage. Its leaves reach a length of 3 cm. The indumentum, too, is not so spongy as in typical members of the series, in this resembling one of its allies in the series *Rh. nwaiense*, Balf. f. et Ward from a more southern station. From *Rh. nwaiense*, its nearest relation, the following are other diagnostic marks:—The scales of the vegetative bud are early deciduous, the inner bracts are much larger, the bracteoles equal in length the calyx, the pedicels are glabrous, the reddish calyx-lobes have curious green scales on the back and the margin is fringed with scales and has also a few short cilia, which may be the stalks of decapitated scales. See also what is said under *Rh. nwaiense*, Balf. f. et Ward, p. 252.

The glacier valley in which Mr. Ward found this yellow-flowered *Rhododendron* yielded to him another new species, *Rh. chamaetortum*, Balf. f. et Ward, forming carpets at a higher altitude and possessing pink flowers.

See also p. 316.



**Rhododendron habrotrichum**, Balf. f. et W. W. Sm.

Frutex ad 3 m. altus ramis crassis. Ramuli annotini nigro-purpurascens circ. 3 mm. diam. strigillosi setulis rigidis purpurascens ad 6 mm. longis glandula ovoideo-capitata terminatis dense oblecti vetustiores estrigillosi vel vestigiis conspersi cinerei tandem decorticantes. Alabastrorum ovoideorum perulae fulvae paucae late ovatae obtusae margine subciliatae carinatae carina plus minusve glanduloso-setulosa. Folia petiolata ad 14 cm. longa; lamina coriacea elliptico-oblonga ad 12 cm. longa ad 7 cm. lata apice obtusa vel subacuminata mucrone corneo terminata margine cartilaginea pectinatim setulosa basi cordulata lobis rotundatis supra atro-viridis in juventute (costa media sulcata setulosa caeteroquin venarum reti obscuro) pilis glandulosis stipitatis vertice radiatim longe ramosis setulisque paucis conspersis induta in adultis (costa media basim versus setulosa cum venis primariis utrinsecus circ. 12 sulcata excepta) glabrescens areolato-venulosa, subtus (juvenilis et adulta) pallidior plus minusve fulva venarum reti elevato suberubescens costa media ad medium vel ultro setulosa caeteroquin plus minusve pilis subcaulifloris glandulosis punctulatim notata; petiolus crassus circ. 2 cm. longus 4 mm. latus dense glanduloso-strigillosus. Flores in umbellam multifloram compactam rhachi glanduloso-setulosa aggregati; bractae steriles crustaceo-coriaceae a basi late ovatae vaginatae acuminatae vel subcaudatae dorso margineque glanduloso-setulosae intus puberulae et plus minusve glandulosae fertiles inaequales ad 2.5 cm. longae 1.5 cm. latae obovatae vel spatulatae haud crustaceae extus intusque sericeae apice acuminatae margine glanduloso-setulosae; prophylla brevia ad 8 mm. longa lineari-filiformia ramentacea sericea; pedicelli ad 2 cm. longi glanduloso-setulosi. Calyx ad 1.4 cm. longus extus glanduloso-setulosus intus glaber in lobos 5 a basi lanceolatos fere ad basim fissus; cupula lata; lobi acuti coriacei margine glanduloso-setulosi. Corolla pallide rosea ad 5 cm. longa infundibuliformis supra in lobos 5 inaequales ampliata extus intusque glabra lobis rotundatis maximis circ. 1.5 cm. longis 3 cm. latis emarginatis. Stamina 10 inaequalia (longissimum fere tubum corollinum aequans) filamentis deorsum dilatatis in triente infero dense puberulis antheris circ. 4 mm. longis. Ovarium cylindricum 5-lobatum dense glanduloso-setulosum; stylus staminibus paullo longior tubum corollinum paullo superans in triente infero glanduloso-setulosus supra expansus stigmate lobulato coronatus. Capsula ab apice pedicelli paullo decurvata calyce plus minusve persistente inclusa circ. 2 cm. longa 5 mm. lata nigra et glanduloso-setulosa. Semina straminea oblonga ad extremitates piloso-arillata.



Species *Rh. Smithii*, Nutt., forsan affinis sed calyce longiore, filamentis pubescentibus, stylo glanduloso-setuloso omnino diversa.

Yunnan. Western flank of the Shweli-Salween Divide. Lat. 25° 20' N. Shrub of 3-8 ft. In fruit. *Rhododendron* forest. G. Forrest. No. 9048. Aug. 1912.

Yunnan. Shweli-Salween Divide. Lat. 25° 30' N. Shrub of 6-10 ft. Flowers pale rose. Open situations in *Rhododendron* thickets and amongst rocks. G. Forrest. No. 12,054. June 1913.

This may be looked upon perhaps as a W. Chinese representative of the Himalayan *Rh. Smithii*, Hook. f. The Chinese and Himalayan species are readily distinguishable by the indumentum of the leaf under-side, which, though cast in the same mould in the two species, forms tufts of woolly tomentum in the Himalayan plant. It has also much larger flowers and many other characters of separation. The prominent resemblance is in the bristles.

#### ***Rhododendron haemonium*, Balf. f. et Cooper.**

Frutex parvus ramis plurimis foliisque coriaceis supra atro-viridibus subtus sanguineis. Ramuli annotini circ. 2 mm. diam. saepe virgati squamis rufis peltatis stipitatis obtecti et squamarum decapitatarum stipitibus quasi setulosi vetustiores grisei saepe nigricantes mox decorticantes. Alabastrorum oblongo-ovoideorum perulae mox deciduae externae parvae circ. 5 mm. longae 2.5 mm. latae oblongae carinatae acutae vel acuminatae coriaceae dorso rufo-lepidotae ciliatae. Folia petiolata ad 3.5 cm. longa; lamina crasse coriacea ad 2.8 cm. longa ad 1.2 cm. lata oblonga apice obtusa corneo-apiculata margine revoluta integra basi obtusa subrotundata nec cordulata supra atro-viridis squamarum juvenilium vestigiis pulverulenta costa media sulcata caeteroquin reticulatim subsulcata subtus costa media straminea elevata sparsim rufo-lepidota caeteroquin squamis sanguineo-resinosis longius breviusque stipitatis in stratum laeve agglutinatis decorata; petiolus circ. 8 mm. longus rufo-lepidotus. Flores lutei in umbellas capituliformes multifloras racemose dispositi; bracteae externae coriaceae late ovatae vel rotundatae carinatae acutae vel acuminatae vel obtusae et apiculatae interiores spadiceo-brunneae spathulatae ad 7 mm. longae ad 3 mm. latae extus rufo-lepidotae et subsericeo-puberulae longiuscule ciliatae intus plus minusve puberulae; prophylla subclaviformia vel linearia ramentacea extus lepidota lanato-ciliata ad 6 mm. longa calycem subaequantia; pedicelli inaequales ad 4 mm. longi (inferi breviores) luteo-lepidoti. Calyx circ. 4 mm. longus fere

ad basim crateriformem fissus lobis oblongis vel oblongo-ellipticis vel rotundatis ad 2 mm. latis membranaceis nitidis viridibus obtusis nunc apice-subdenticulatis dorso elepidotis vel sparsissime lepidotis margine apiceque pilis brevibus vel longis sparse vel copiose ciliatis intus glabris. Corollae circ. 1.4 cm. longae tubus latus brevis obliquus subcarnosulus antice circ. 6 mm. longus postice circ. 8 mm. extus lepidibus sparsissime conspersus intus villosulus ad faucem barbatus, limbi lati explanati subrepandi discus circ. 1.5 mm. latus, lobi magni rotundati ad 7 mm. diam. crenulati et utrinque lepidibus sparsissime conspersi. Stamina 5 circ. 5 mm. longa filamentis deorsum dilatatis glabris antheris oblongis circ. 1 mm. longis. Ovarium ovoideum 5-lobatum circ. 1.5 mm. longum lepidibus luteis plus minusve indutum nunc fere nudum subpurpurascens; stylus ovarium aequans clavatus stigmatibus 5-lobato coronatus.

Species nova ex affinitate *Rh. anthopogonis*, Don floribus luteis calyce glabro et notis aliis multis valde diversa.

Bhutan. Pungo La Timpu, W. Alt. 13,000 ft. Shrub on hilltops. Flowers yellow. R. E. Cooper. No. 3903. 15th May 1915.

This is a distinct species of the *Anthopogon* series. It resembles somewhat the N.W. Himalayan yellow-flowered *Rh. hypenanthum*, Balf. f. for long confused with *Rh. anthopogon*, Don, but is distinguished at sight by the absence from its branches of clusters of persistent leaf-bud scale-leaves. From true *Rh. anthopogon*, Don the colour of the flower of *Rh. haemonium* is also diagnostic as it is from *Rh. fragrans*, Maxim. The glabrous character of its calyx also separates.

See also p. 286.

### ***Rhododendron hedyosmum*, Balf. f.**

Suffrutex aromaticus ad 30 cm. altus ramosissimus parvifolius. Ramuli hornotini virides squamis fuscis peltatis longe stipitatis plus minusve laxe induti vetustiores fusci deinde nigricantes decorticantes. Alabastra parva ovoidea acuta perulis mox deciduis carinatis anguste ovatis acutis dorso lepidotis margine ciliatis. Folia crasse coriacea breviter petiolata ad 2.5 cm. longa; lamina elongato-oblonga ad 2 cm. longa ad 7 mm. lata apice corneo-mucronulata margine vix revoluta obscure ciliata stipitibusque squamarum asperata basi obtusa vel subcuneata supra atro-viridis squamarum juvenilium flavidarum vestigiis conspersis plus minusve pulverulenta costa media sulcata caeteroquin reticulatim rugulosa subtus sordide fusca squamis peltatis longius stipitatis instita subangusta in stratum distale laxum super stratum squamarum minus evolutarum dispositis costa media pallide flavido-viridi elevata sparsim lepidota;

petiolus ad 4 mm. longus laxe lepidotus. Flores cerini ad 7 in umbellas veras parvas terminales inter ramulos foliatis subflorales praecoces immersas aggregati inflorescentiae rhachi brevissima puberula; bractae steriles sordide fuscae ovatae acutae coriaceae extus lepidotae intus adpresso-puberulae minute ciliatae fertiles membranaciores obovatae vel spathulatae luteae extus fusco-lepidotae ciliatae circ. 1 cm. longae 4 mm. latae pedicellum et calycem multo superantes mox deciduae; prophylla lineari-clavata flavida supra dorso lepidota lanato-ciliata circ. 1.3 cm. longa calycem aequantia conspicua persistentia; pedicelli circ. 5 mm. longi lepidoti. Calyx viridis fere ad basim fissus cupula sparsim ciliata lobis a basi lanceolatis vel anguste ovatis obtusis extus intusque glabris margine lepidotis nunc setulis sparsis etiam ciliatis. Corollae longe tubulosae obliquae subcarnosulae circ. 2 cm. longae tubus ab axe florali paullo curvatus extus glaber intus sparsim pubescens sursum in lobos 5 circ. 6 mm. longos subellipticos integros basi latos infundibuliformi-ampliatus. Stamina 5 filamentis ad basim bulbosim expansis glabris circ. 6 mm. longis, antheris oblongis. Ovarium 1.5 mm. longum 5-lobatum squamis plus minusve lepidotum viscidum; stylus ovarium aequans clavatus glaber stigmate 5-lobato coronatus.

Species *Rh. Sargentiano*, Rehder et Wilson affinis sed robustior et altior et foliis fere duplo longioribus, perulis haud persistentibus, floribus albido-cerinis, pedicellis brevioribus, calycibus multo minoribus, corollis majoribus elepidotis facile recognoscenda.

Szechwan?

This plant appeared in the Royal Botanic Garden, Edinburgh, in two or three specimens amongst a batch of *Rh. Sargentianum*, Rehder et Wilson raised from seeds in 1909 under Wilson's number 1208. The seeds were the gift of Sir John Stirling Maxwell, Bart. of Pollok, who generously presented to the Garden his share of the spoils of Wilson's exploration. By its growth and size and shape of leaf it is so different from *Rh. Sargentianum* that we have been prepared for something not of the type. *Rh. Sargentianum* has flowered freely during the past few years—this plant flowered in 1916 for the first time, and then some weeks before *Rh. Sargentianum*, producing small trusses of waxy white flowers with much longer corollatube than that of *Rh. Sargentianum*, and wanting entirely the coating of scales on the outside. The plant is very different from *Rh. Sargentianum*. I do not know if it has turned up elsewhere in cultivation.

See also p. 316.

**Rhododendron hippophaeoides**, Balf. f. et W. W. Sm.

Fruticulus parvus ad 1.5 m. altus copiose ramosus ramis saepe intricatim intertextis. Ramuli juveniles saepe virgati circ. 2 mm. diam. squamis dense furfuracei ochracei, seniores reliquiis squamarum verruculosi cortice mox desquamante. Alabastrorum oblongorum parvorum .5 cm. longorum perulae oblongae pallide brunneae crustaceae subtus lepidotae margine ciliatae. Folia crasse coriacea petiolata; lamina oblonga ad 3 cm. longa ad 1 cm. lata apice obtusa vel rotundata obscure mucronulata margine paullo revoluta basi cuneata, paginae superioris superficies atroviridis squamis breviter stipitatis peltatis ex umbone lutescente et instita aequilata albida translucente margine minutissime fimbriata constructis uniformibus contiguis oblecta inferioris ubique squamarum similium imbricatarum opertu pallido ochraceo-nitente occulta costa media supra paullo sulcata subtus prominula venis primariis opertis; petiolus circ. 4 mm. longus dense lepidotus. Inflorescentia terminalis floribus subcoeruleis in umbellam capitulatam ad 7-floram aggregatis; bractee fulvae exteriores crustaceae late ovatae interiores submembranaceae rotundatae retusae vel truncatae omnes extus lepidotae margine ciliatae; pedicelli circ. 4 mm. longi sub calyce haud dilatati dense lepidoto-tomentosi prophyllis filiformibus quam pedicelli dimidio brevioribus. Calyx ad basim fissus lobis 5 subaequalibus circ. 1.5 mm. longis oblongis vel ovatis extus dense lepidotis pilis longis praesertim ad apicem fimbriatis. Corolla extus elepidota subrotata circ. 1.2. cm. longa, tubo campanulato brevi circ. 2 mm. longo, limbi disco patente circ. 4 mm. lato intus pubescente, lobis 5 rotundatis circ. 8 mm. diam. undulatis. Stamina 8-10 subaequalia ex ore tubi corollini longe patentia limbo breviora filamentis corollae concoloribus supra basim villosocinctis, antheris spadiceis. Ovarium parvum tubum corollinum subaequans viride lepidotum; stylus purpureus glaber staminibus brevior ovario duplo longior; stigma stylo vix latius. Capsula ovoidea circ. 7 mm. longa et 3.5 mm. lata brunnea lepidota; pedicellus elongatus fere ad 8 mm. longus.

Species aspectu *Rh. intricati*, Franch. ramulorum indumento furfuraceo, foliis majoribus, pedicellis sub calyce haud dilatatis, calyce pilis longis fimbriato, corollae tubo campanulato haud ventricosus, stylo quam ovarium duplo longiore distincta.

Yunnan. Valley of Chung River. Alt. 10,500 ft. Dwarf shrub forming carpets or separate tufts 9 ins. to 1 ft. high in open pine forest. Kingdon Ward. No. 269B. May 1913.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 11,000-12,000 ft. Shrub of 4-5 ft. Flowers

blue, drying lavender-blue. Open situations in alpine scrub. G. Forrest. No. 10,333. July 1913.

Yunnan. Duplicate of No. 10,333 in mature fruit. G. Forrest. No. 11,487. Oct. 1913.

Yunnan. Lichiang Range. Lat. 27° 30' N. Alt. 10,000 ft. Shrub of 2 ft. Flowers pale bluish-rose. Open marshy meadows. G. Forrest. No. 12,461. June 1914.

Yunnan. Mountains west of the Fengkow Valley. Lat. 27° 40' N. Alt. 12,000 ft. Shrub of 3-4 ft. Flowers lavender-blue, anthers indian red. Boggy peaty meadows. G. Forrest. No. 12,562. June 1914.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 14,000 ft. Shrub of 3-4 ft. Flowers lavender-blue. Open moist stony pasture. G. Forrest. No. 12,633. July 1914.

A striking species of the *Lapponicum* series, which in its many-flowered compact truss of blue-purple flowers suggests *Rh. intricatum*, Franch. But it is far removed from that species, which is an exceptional one in the *Lapponicum* series, as I have explained above when writing of *Rh. complexum*, Balf. f. et W. W. Sm. *Rh. hippophaeoides* finds its nearest ally in *Rh. Websterianum*, Rehder et Wilson. Like that plant it is hoary, but there is more yellow in the tint of its foliage and twigs. It is also a more virgate shrub than is Rehder and Wilson's species, and has much larger flower trusses—7-flowered instead of 2-3-flowered. I may add also that the style of *Rh. Websterianum* is often lepidote or hairy. In indumentum our species belongs to a set of species—*Rh. idoneum*, Balf. f. et W. W. Sm., *Rh. polifolium*, Franch., in addition to *Rh. intricatum*, *Rh. thymifolium*, Maxim., *Rh. Websterianum*—which have remarkable shiny grey not punctulate under-leaf surface, the scales being large and almost or quite contiguous. *Rh. hippophaeoides* is now in cultivation.

See also p. 299.

### ***Rhododendron idoneum*, Balf. f. et W. W. Sm.**

Suffrutex nanus parvifolius pulvinatus ramis congestis ad 4 dm. altus. Ramuli annui breves vix 1 cm. longi, hornotini ferrugineo-lepidoti circ. 1.5 mm. diam. seniores sordide grisei corrugati mox decorticantes. Alabastrorum ovoideorum parvorum perulae ovatae spadiceo-lepidotae. Folia petiolata crasse coriacea circ. 8.5 mm. longa; lamina elliptica vel subrotundata nunc subovata circ. 6.5 mm. longa 4 mm. lata vertice rotundata neque angustata costae mediae apice deflexo et mucrone terminato leviter revoluta basi rotundata vel late obtusa supra atro-viridis subcanescens squamis peltatis contiguis



persistentibus adpressis uniformibus umbone languide flavido institaque alba constructis induta subtus helvola nitens squamis ut supra aedificatis uniformibus contiguis persistentibus lepidota costa media utrinque vix conspicua venisque caeteris occultis; petiolus circ. 2 mm. longus rufescenti-lepidotus. Flores in umbellam 2-floram terminalem dispositi; bracteae exteriores crustaceae ovatae vel rotundatae dorso lepidotae margine ciliatae interiores oblongae membranaceae extus pubescentes; pedicelli circ. 1 mm. longi lepidoti; bracteolae minutissimae. Calyx circ. 3 mm. longus fere ad basim in lobos 5 inaequales fissus, cupula lepidota, lobis saepe purpureis membranaceis oblongis vel a basi lanceolatis vel late ovatis obtusis vel acutis dorso lepidotis margine apiceque pilis longis ciliatis. Corollae purpureo-coeruleae circ. 1.2 cm. longae tubus brevis circ. 4 mm. longus infundibuliformis extus glaber intus ad faucem pilis lanatis albedo-villosus, limbi discus concavus angustus, lobi late elliptici vel subrotundati circ. 8 mm. longi extus sparse lepidoti. Stamina 8-10 corollam aequantia filamentis supra basim prope faucem tubi corollini albo-villosis. Ovarium pallide viride canescens lepidotum; stylus glaber kermesinus corollam staminaque superans; stigma discoideum lobulatum. Capsulae circ. 5 mm. longae lepidotae pars inferior calyce inclusa.

Species fastigiata *Rh. polifolio*, Franch. affinis sed habitu, foliorum forma, corollae lobis extus lepidotis fauceque dense villosa diversa.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 13,000-14,000 ft. Open ledges of cliffs and stony pasture. G. Forrest. No. 12,623. July 1914. Cushion shrub 12-16 ins. Flowers deep purplish blue, throat white.

A remarkably floriferous species of the Lapponicum series with short not virgate branches. It comes near *Rh. polifolium*, Franch., but that species is an erect grower, with longer shoots, smaller flowers, and its corolla is not lepidote outside. Moreover, whilst the throat of the corolla in *Rh. polifolium* is pubescent and its stamens slightly pubescent above the base, there is not the conspicuous white villous tuft as in *Rh. idoneum*, Balf. f. et W. W. Sm. *Rh. idoneum* is the only species with lepidote corolla in a small group of the Lapponicum series which have contiguous grey-white or leather-coloured under-leaf indumentum of a shiny uniform character and not punctulate, and thus may readily be distinguished. In addition to *Rh. polifolium*, the allied species are *Rh. blepharocalyx*, Franch., *Rh. intricatum*, Franch., *Rh. hippophaeoides*, Balf. f. et W. W. Sm., and *Rh. Websterianum*, Rehder et Wilson.

See also p. 300.

**Rhododendron impeditum**, Balf. f. et W. W. Sm.

Suffrutex parvifolius nanus ad 5 dm. altus ramulis plurimis intertextis in pulvinos lignosos rotundatos evolutus. Ramuli hornotini brevissimi circ. 8 mm. longi 1 mm. diam. squamis peltatis ferrugineis dense furfuracei seniores nigricantes sordide grisei et decorticantes. Alabastrorum minorum ovoideorum perulae externae ovatae crassiusculae extus lepidotae margine plus minusve ciliatae internae oblongae vel oblongo-spathulatae obtusae pilis marginalibus et apicalibus longis ciliatae. Folia coriacea breviter petiolata ad 1 cm. longa; lamina ad 8.5 mm. longa 4.5 mm. lata elliptica apice rotundata obscure mucronulata margine paullo revoluta basi obtusa vix attenuata supra atroviridis squamis peltatis uniformibus persistentibus fere contiguis stipite vix impresso umbone flavido vix nitente et instita albidula integra quam umbo latiore constructis furfuraceo-lepidota subtus papillis epidermicis ceriferis truncatis cuboideis subglaucis et squamis ut supra aedificatis discontiguis omnino ferrugineis in foveolis profundis umbone infra os foveolae depresso orientibus induta venarum reti occulto costa media subtus basi excepta; petiolus brevissimus vix 1.5 mm. longus ferrugineus furfuraceo-lepidotus. Flores in umbellam plerumque 2-floram terminalem dispositi; alabastra ovoidea bracteis externis ovatis vel subrotundatis extus lepidotis ciliatis mox deciduis; pedicelli vix 1 mm. longi lepidoti. Calyx conspicuus circ. 3 mm. longus corollae tubum subaequans fere ad basim fissus tubo lepidoto, lobis viridibus vel subpurpurascensibus elepidotis vel nunc squamulas 1-2 gerentibus firmis oblongis vel subrotundatis vel subquadratis aequalibus vel inaequalibus obtusis ad apicem marginemque pilis longis undulatis paucis vestitis. Corollae violaceo-purpureae extus elepidotae tubus brevis circ. 3.5 mm. longus uniformiter cylindricus intus ad os breviter pubescens, limbi concavi discus circ. 2 mm. latus, lobi 5 late ovati vel oblongi vel subrotundati margine undulati circ. 8 mm. longi. Stamina 10 tubum corollinum subaequantia filamentis purpureis ad os corollae pilis rectis erectis floccosim cinctis antheris purpureis. Ovarium conoideum albidolepidotum; stylus purpureus glaber corollam staminaque multo excedens: stigma lobulatum. Capsula circ. 4 mm. longa rufescens vix lepidota.

Species fastigiata *Rh. oresbio*, Balf. f. et Ward et *Rh. scintillanti*, Balf. f. et W. W. Sm. affinis sed foliorum lamina vere elliptica, calycis forma et stylo puberulo recedit. *Rh. fastigiatum* Franch. corollam extus lepidotam possedit.

Yunnan. Eastern flank of the Lichiang Range. Lat. 27° 20' N. Alt. 15,000-16,000 ft. Dwarf matted shrub of 6-12 ins.

Flowers light purplish-blue. On open peaty pasture. Forrest. No. 5863. June 1910.

Yunnan. Western flank of the Lichiang Range. Lat.  $27^{\circ} 20'$  N. Alt. 12,000–13,000 ft. Shrub of 6–20 ins. Flowers deep purplish-blue, throat white. Forming symmetrically rounded tufts on alpine meadows. Forrest. No. 5876. June 1910.

One of the species of the *Lapponicum* series of *Rhododendrons* which is in cultivation and commonly under the name of *Rh. fastigiatum*, Franch. Like that plant in its cushion-habit its foliage is very different, and one can distinguish the two plants at a glance. *Rh. fastigiatum* has a grey hoary appearance, *Rh. impeditum* dark green. Both the plants have discontinuous under-leaf scales, but whilst in *Rh. fastigiatum* the bare intervals of epidermis are greyish, often tinted slightly red, in *Rh. impeditum* the epidermis is mat green. The flower distinguishes them at once, for the corolla in *Rh. fastigiatum* is lepidote outside, in this new species elepidote. Its nearest ally is really *Rh. scintillans*, Balf. f. et W. W. Sm., but that has oblong leaves narrowed to the ends, not elliptic and rounded.

See also p. 300.

***Rhododendron ixeticum*, Balf. f. et W. W. Sm.**

Frutex ad 3.5 m. altus. Ramuli hornotini viscidissimi circ. 4 mm. diam. glandulis rubris clavatis longe stipitatis setiformibus dense obsiti vetustiores vestigiis siccis glandularum setiformium et cataphyllorum et bractearum et petiolorum annorum praetertorum obtecti. Alabastra oblonga cataphyllis brunneis persistentibus externis oblongo-rotundatis firmis intermediis elongatis ligulatis circ. 2.5 cm. longis 5 mm. latis coriaceis extus glabris intus caulis secretionem vernicosam intimis membranaceis pubescentibus. Folia ad 13 cm. longa; lamina lanceolata vel oblanceolata ad 11.5 cm. longa ad 3.5 cm. lata apice subacuminata margine vix revoluta basi obtusa supra juventute floccis pilorum lanatorum glandulisque stipitatis intermixtis tomentosim vestita maturitate atro-viridis subnitens glabrescens costa media sulcata plus minusve tomentosa venis primariis utrinsecus ad 18 sulcatis caeteroquin squali corium simulans subtus dense lanato-tomentosa primo sublactea postea glandulis rubris stipitatis pilis intermixtis rufescens costa media prominula rubescente densius glandulosa venis primariis nonnunquam prominulis; petiolus ad 1.5 cm. longus setuloso-glandulosus viscidissimus. Flores in umbellam ad 12-floram laxam racemose dispositi; bracteae longe caudatae basi rotundatae coriaceae rubro-brunneae extus viscidiae glandulis tuberculatae; pedicelli ad 3 cm. longi viscidissimi glandulis rubris setiformibus brevibus et pilis paucis

brevibus dense vestiti. Calyx poculiformis fere ad basim 5-lobatus, lobis oblongis ad 1 cm. longis intus laevibus extus margineque dense setuloso-glandulosus. Corolla tubuloso-campulata ad 3 cm. longa tubo circ. 2 cm. longo extus glabro intus ad basim posteriorem glanduloso, lobis ad 2 cm. latis emarginatis. Stamina 10 inaequalia tubum corollae aequantia, filamentis basi latioribus ibique glandulosus. Ovarium glandulis rubris ascendentibus stipitatis dense obtectum; stylus basi setuloso-glandulosus staminibus longior; stigma discoideum lobulatum. Capsula curvata glandulosa circ. 1.8 cm. longa 5 mm. lata.

Species *Rh. adenophoro*, Balf. f. et W. W. Sm. affinis, ramis vestigiis foliorum obtectis, tegmento glandularum stipitatarum viscidissimo distincta.

Yunnan. Kari Pass, Mekong-Yangtze Divide. Lat. 27° 40' N. Alt. 12,000 ft. Shrub of 10-12 ft. In fruit. Open situations amongst boulders. G. Forrest. No. 12,944. August 1914.

Yunnan. Mekong-Salween Divide. Lat. 28° 10' N. Alt. 13,000 ft. Shrub of 8-10 ft. Flowers? In fruit. In open thickets. G. Forrest. No. 13,244. Sept. 1914.

Yunnan. G. Forrest. No. 13,551. Oct. 1914. In mature fruit.

Yunnan. G. Forrest. No. 13,592. Nov. 1914.

A distinct species amongst Rhododendrons which have a white persistent favose indumentum on the under side of the leaf. The feature catching the eye in the dried specimens is that of the persistent dried leaf-bud scale-leaves bracts and leaf petioles clothing the old branches, all more or less sticking together by the viscid excretion of the setulose glands. These glands occur on every part of the shoot. The actual secreting gland-area is oblong or club-shaped at the end of a longer or shorter stalk. The longer ones are like setae and there are all lengths down to almost unstalked glands. The surfaces of the pedicels and calyx are made strigillose by them. On the under surface of the leaf they are not obvious, being buried amongst the lanate hairs—but they are present in numbers. On the upper surface of the old leaf there remain but a few scattered glands. The hairs of the tomentum of the leaf start as pluricellular pedicels which gradually lose themselves in many twisted thick-walled threads branching freely and interwoven, the ultimate branches having a pointed end.

The flowers for examination have not been of the best. It is possible that we have two species here, and that Nos. 13,244, 13,551, and 12,592 should be separated from No. 12,944.

**Rhododendron jucundum**, Balf. f. et W. W. Sm.

*Rh. Souliei*, Diels non Franch. in Notes, R.B.G., Edin., v (1912), 217.

Frutex vel arbor parva ad 6 m. altus ramis tortuosis plurimis brevibus. Ramuli hornotini glandulis rubris stipitatis obsiti subsetulosi annotini ad 3 mm. diam. glandularum vestigiis plus minusve verrucosi rubidi vetustiores griseo-albi mox desquamantes. Alabastrorum oblongorum acutorum circ. 3 mm. diam. perulae extimae rotundatae apiculatae vel breviter caudatae intermediae oblongae ad apicem brevissime ciliolatae intimae oblongo-spathulatae circ. 3 cm. longae submembranaceae apice erubescentes pubescentes. Folia ad 8 cm. longa longe petiolata; lamina elliptica vel elliptico-oblonga vel fere oblonga ad 6.5 cm. longa ad 3.5 cm. lata apiculata lateribus paullo convexis margine cartilaginea basi cordata vel cordulata utrinque pilorum juvenilium vestigiis notata supra atro-viridis glabrescens costa media venisque primariis utrinsecus circ. 13 impressis subtus suberubescens papillis ceriferis brevibus petasiformibus glauca costa media elevata caeteroquin laevis venarum reti purpurascens haud elevato lamina in juventute supra pilis paucis stipitatis digitatim ramosis ramulis setiformibus conspersa subtus glandulis parvis caulifloribus propinquis aurantiacis nunc albidis nunc rubidis et praecipue ad costam mediam glandulis stipitatis elevatis apice rubris oblecta; petiolus circ. 1.5 cm. longus rubescens glandulis rubris longe stipitatis oblectus (subglanduloso-setulosus). Inflorescentia umbellata terminalis 5-8-flora; bractae ignotae; pedicelli stricti rigidi rubescentes circ. 2 cm. longi glandulis rubris longe pedicellatis setulosim vestiti in cupulam calycinam expansi. Calycis cupula circ. 1 mm. longa glandulosa rubida, lobi oblongi obtusi vel apice rotundati circ. 5 mm. longi membranacei dorso plerumque eglandulosi margine glanduloso-ciliolati sed variabiles nunc vix evoluti nunc breviores et glandulosiores. Corolla rosea nunc pallida fere alba a basi angusta aperte campanulata circ. 3 cm. longa extus elepidota pilosa tubo intus pubescente lobis 5 rotundatis emarginatis circ. 1.2 cm. longis 2 cm. latis. Stamina 10 inaequalia longiora ultra basim loborum corollinarum leviter extensa filamentis infra latioribus dense pubescentibus antheris intense coloratis. Ovarium oblongum glandulis elevatis stipite longo capite rubro dense vestitum; stylus eglandulosus pallidus glaber nonnunquam plus minusve minutissime puberulus corollae vix aequilongus staminibus longior; stigma discoideum.

Species cum *Rh. Souliei*, Franch. olim confusa sed inquisitione curiosa notis sequentibus facile distinguenda:—foliorum juvenilium indumento ejusque vestigiis in foliis adultis, corollae forma, staminibus pubescentibus, stylo eglanduloso.



Yunnan. Open rocky situations on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 10,000–11,000 ft. Shrub of 4–8 ft. Flowers pale rose. Forrest. No. 4148. July 1906.

Yunnan. Dry rocky situations on mountain meadows on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 10,000–11,000 ft. Shrub of 6–10 ft. Flowers rose-pink. Forrest. No. 4150. July 1906.

Yunnan. Open mountain meadows on the margins of pine forests and cane brakes on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 11,000–12,000 ft. Shrub of 3–6 ft. Flower bright lavender-rose. Forrest. No. 4154. Aug. 1906.

Yunnan. Eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 12,000 ft. Shrub or tree of 10–20 ft. Flowers white or pale rose. Rhododendron forest. Forrest. No. 6765. July 1910.

This is a very different plant from *P. Souliei* with which Diels identified it. *Rh. Souliei*, Franch. is a Szechwan plant and is not recorded from Yunnan. *Rh. jucundum* is a plant restricted so far as we know to the eastern flank of the Tali Range in western Yunnan. Apart from the indumentum features, which are easily observed, the flower offers two distinctive characters: the corolla here has not the wide open form so marked in *Rh. Souliei*, and the style is quite glabrous.

The western flank of the Tali Range contributes three plants to Mr. Forrest's collection under Nos. 11,577, 11,578, and 11,601 which belong to the series including *Rh. jucundum*, and are probably new species.

### *Rhododendron ledoides*, Balf. f. et W. W. Sm.

Fruticulus virgatus dense intricatim et tenuiter ramosus. Ramuli hornotini squamis laxis fulvis porriginosi annotini squamarum vestigiis nigricantibus induti stipitibus decapitatis albidis setuloso-hirsuti seniores nudi plus minusve grisei tandem decorticantes. Alabastra oblonga obtusa parva perulis mox deciduis anguste ovatis coriaceis extus lepidotis circumdata. Folia breviter petiolata circ. 1.7 cm. longa crasse coriacea; lamina lineari-lanceolata vel oblongo-lanceolata circ. 1.5 cm. longa 5 mm. lata apice obtusa corneo-mucronulata margine integra revoluta basi obtusa, supra atro-viridis costa media sulcata caeteroquin obscure venulosa et squamarum vestigiis conspersis subasperata, subtus fulva squamis contiguais inaequaliter stipitatis ex umbone convexo (fulvo-colorato in squamulis longe stipitatis) institaque fimbriata aedificatis porriginosim induta costa media elevata; petiolus circ. 2 mm. longus lepidotus. Flores in umbellam capituliformem terminalem rhachi

puberula congesti; inflorescentiae alabastra globosa; bractae externae ovatae vel late ovatae obtusae carinatae fulvae coriaceae extus lepidotae margine minute albido-ciliatae; prophylla parva claviformia calyce breviora ciliata; pedicelli breves ad 1.5 mm. longi lepidoti. Calyx parvus circ. 2 mm. longus fere ad basim fissus lobis imbricatis subrotundatis vel subellipticis subtruncatis viridibus extus sparsim lepidotis intus adpresso-puberulis ciliatis. Corollae tubus circ. 1 cm. longus angustus circ. 1.5 cm. diam. paullo curvatus extus glaber intus villosulus, limbi explanati discus circ. 1 mm. latus, lobi circ. 3 mm. lati subrotundati leviter crenulati. Stamina 5 circ. 4 mm. longa filamentis complanatis deorsum paullo dilatatis supra basim leviter puberulis antheris oblongis. Ovarium ovoideum 5-lobatum squamis contiguas parvis dense lepidotum; stylus clavatus ovario paullo brevior stigmate 5-lobato coronatus.

Species lediformis ex affinitate *Rh. cephalanthi*, Franch. foliis parvis angustis, perulis deciduis, prophyllis calyce brevioribus, inflorescentiae rhachi puberula, pedicellis brevibus lepidotis, corolla extus glabra, staminum filamentis puberulis, stylo quam ovarium paullo brevius notata.

Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 13,000 ft. Lat. 27° 45' N. Shrub of 2 ft. In fruit. Flowers? Open stony pastures. G. Forrest. No. 11,246. Sept. 1913.

This species of the *Cephalanthum* series is one of the narrow-leaved forms with twiggy shoots on which the leaf-bud scales do not persist. Its nearest ally is *Rh. sphaeranthum*, Balf. f. et W. W. Sm., known from the Fengkow Pass, which has flowered in cultivation. *Rh. ledoides* is also in cultivation but I have not heard that it has flowered. In width of foliage *Rh. ledoides* seems to be somewhat variable. Most of Forrest's specimens have quite narrow leaves, and the fruit trusses nestling amidst the twigs recall strongly the features seen in *Ledum*. One specimen shows the foliage larger and broader, and it might pass at sight for *Rh. sphaeranthum*. But analysis brings out characters which sufficiently differentiate the two plants. Differentiating marks in *Rh. ledoides* are: the bracteoles shorter than the calyx (in *Rh. sphaeranthum* they are remarkably long and far exceed the calyx), the puberulous not lepidote rhachis of inflorescence, the corolla glabrous outside not puberulous and lepidote, the glabrous not puberulous filaments of the stamens, the style equal in length to the ovary, not very much shorter.

With *Rh. radinum*, Balf. f. et W. W. Sm., another lediform species of the *Cephalanthum* series, our species has also resemblance, but *Rh. radinum* has persistent not deciduous leaf-bud

scale-leaves, has sessile flowers, with corollas densely lepidote on the outside, and the style is much shorter than the ovary.

Of *Rh. ledoides* we have no perfect flowers, only withered ones attached to young fruits, and there are gaps therefore in the description.

See also p. 316.

**Rhododendron lepidanthum**, Balf. f. et W. W. Sm.

Frutex aromaticus ad 1.5 m. altus ramosissimus parvifolius. Ramuli hornotini squamis flavidis longe stipitatis lepidoti annotini squamarum decapitatarum stipitibus fulvis plus minusve setuloso-pubescentes vetustiores grisei decorticantes. Alabastrorum ovoideorum acutorum perulae pallide helvolae ovatae coriaceae dorso nitido-lepidotae margine breviter ciliatae mox deciduae vel partim persistentes. Folia crasse coriacea breviter petiolata ad 1.7 cm. longa; lamina anguste oblonga ad 1.5 cm. longa ad 6 mm. lata apice obtusa mucronulata margine cartilaginea revoluta pedibus setularum deterrentum punctulata (in juventute plus minusve setulosa) basi obtusa vel cuneata supra atro-viridis costa media sulcata caeteroquin plana squamarum juvenilium flavidarum vestigiis subpulverulenta subtus cinnamomea squamis peltatis longius stipitatis umbonatis instita fimbriata cinctis inter se separatis indumenti spongiosi stratum superius facientibus stratum inferius squamarum senilium breviorum obtegentibus (in juventute dense flavido-lepidota) costa media elevata straminea sparse lepidota; petiolus circ. 3 mm. longus lepidotus. Flores albi in umbellas rhachi glabra capituliformes terminales multifloras (circ. 8) racemose aggregati; bracteae externae helvolae crustaceo-coriaceae ellipticae vel late ovatae plus minusve carinatae mucronulatae dorso nitido-lepidotae interiores submembranaceae circ. 6 mm. longae 3.5 mm. latae obovatae vel subspathulatae obtusae margine lanato-ciliatae; prophylla ad 7 mm. longa ramentacea subspathulata vel claviformia uninervia dorso lepidota margine ciliata calycem in floribus inferis aequantia; pedicelli inaequales superiores longiores ad 8 mm. longi lepidoti. Calyx viridis fere ad basim quinquelobatus circ. 4 mm. longus lobis membranaceis oblongo-ovatis acutis ad 2 mm. latis dorso lepidotis intus puberulis margine hirsuto-ciliatis. Corollae carnosulae circ. 1.2 cm. longae obliquae tubus ab axe florali curvatus circ. 7 mm. longus extus glaber intus ubique villosus basi subventricosus limbi explanati lobis 5 subrotundatis integris circ. 3 mm. diam. dorso dense flavido-lepidotis. Stamina 5 circ. 6 mm. longa filamentis basi subtumidis supra basim minute puberulis antheris oblongis circ. 1 mm. longis. Ovarium ovoideum circ. 2 mm. longum 5-lobatum squamis flavidis plus

minusve lepidotum viscidum; stylus ovario paullo brevior glaber clavatus stigmatе lobato coronatus.

Species *Rh. Sargentiano*, Rehder et Wilson affinis sed fruticulus major et foliis longioribus, bracteis externis latioribus interioribus longioribus, corollae albae majoris tubo extus glabro diversa.

Yunnan. Lichiang Range. Alt. 11,000–14,000 ft. Lat. 27° 30' N. Shrub of 2–5 ft. Flowers white, foliage aromatic. Alpine pasture, ledges and crevices of cliffs. G. Forrest. No. 10,034. May 1913.

An easily distinguished species of the *Cephalanthum* series. It stands somewhere between *Rh. cephalanthoides*, Balf. f. et W. W. Sm. and *Rh. Sargentianum*, Rehder et Wilson, having the larger shrubby habit and elongated leaves of the first-named species, and possessing only a few of the persistent scales which are present in the last-named. It has a slightly fleshy corolla, lepidote on the outside as in *Rh. Sargentianum*, but the scales are restricted to a median patch on the under side of the corolla-lobes, and then the corolla is white not yellow. Other marks of distinction from *Rh. Sargentianum*, are its ovate not oblong outer bracts and its puberulous stamens.

See also p. 316.

***Rhododendron megacalyx*, Balf. f. et Ward.**

Arbor ramosa ad 7.5 m. alta. Rami annotini atrorubentes pilosi vestigiis squamularum albidarum conspersi vetustiores griseo-desquamantes. Alabastra oblonga acuta perulis externis pilosis eglandulosis rotundatis intimis obcuneatis apice rotundatis omnibus intus glabris extus lepidotis. Folia breviter petiolata lepidota ad 15 cm. longa; lamina oblongo-elliptica apice rotundata verrucula incrassata terminata nec acuta nec acuminata margine cartilaginea vix revoluta basi obtusa supra glabra laete viridis foveis squamarum delapsarum vel vestigiis ipsarum notata costa media venisque primariis utrinsecus ad 14 rubidis sulcatis infra pallidior subglauca costa media venisque primariis rubescentibus elevatis squamis superficialibus peltatis umbonem convexum annulo rubro et instita peripherica integra conspicua cinctum exhibentibus praedita caeteroquin papillis albidis baculiformibus et foveolis plurimis haud contiguis notata (foveola quaque squama peltata pallide umbonata annulo rubro institaque angustissima impleta) hic et illic squama majore superficiali eis costae mediae simili latius fimbriata punctata; lamina juvenilis utrinque omnino lepidota squamulis paginae superioris imbricatis eis costae mediae inferae maturae similibus squamulis paginae inferioris (ut ad maturitatem) haud contiguis

et dimorphis; petiolus ad 1.5 cm. longus in morem costae mediae inferae lepidotus. Flores odorati in inflorescentiam umbellatam circ. 5-floram laxè dispositi; bracteae ignotae; pedicelli ad 3 cm. longi elepidoti eglandulosi atrorubri sub calyce expansi. Calyx magnus nigro-brunneus cupularis circ. 2.3 cm. longus chartaceus extus pseudo-furfuraceus basi incrassatus pilosus elepidotus lobis 5 rotundatis circ. 8 mm. longis 2 cm. latis obtusis margine membranaceis. Corolla magna circ. 9 cm. longa alba odorata late infundibuliformi-campanulata basi haud angustata squamulis translucentibus extus lepidota tubo circ. 6 cm. longo extus glabro, lobis 5 rotundatis circ. 4 cm. latis. Stamina 10 breviter tubo corollino inclusa filamentis basim versus plus minusve pubescentibus antheris magnis. Ovarium nigrum dense lepidotum squamis albidis translucentibus; stylus tubo corollino longior basi albo-lepidotus; stigma discoideum lobulatum. Capsula calyce inclusa recta circ. 2 cm. longa 1 cm. lata extus lutescenti-lepidota.

Species *Rh. crasso*, Franch. affinis sed splendidior et foliis oblongis semper obtusis, petiolis brevioribus, pedicellis elepidotis, calyce triplo majore et ad trientem fisso, corolla basi haud angustata, stylo basi solum lepidoto longe distans; *Rh. excellenti*, Hemsl. et Wilson peraffinis, notis foliorum simillima, pedicellis calyceque elepidotis distinguenda.

E. Upper Burma. Nwai Valley. Bushy tree of 15–25 feet, in rain forest, rather open ground, by stream, 7000–8000 ft. Flower white, smelling very sweetly of nutmeg. Kingdon Ward. No. 1628. 4th June 1914.

The plant is an ally of *Rh. crassum*, Franch.—belonging to the group of which that species may be taken as the centre—and like it has a loose few-flowered truss. Its flowers are larger and want the constricted base to the corolla tube which is found in *Rh. crassum*. Its large calyx, three times the size of that in *Rh. crassum*, its pedicels without scales, and the style lepidote only at the base, are also marks separating it. In foliage the species are somewhat alike, but though *Rh. crassum* varies considerably in form of leaf, its leaves always seem to have a sharp-pointed tip. In *Rh. megacalyx* the leaf apex is never pointed though the midrib ends in a hard wart. We hope that Mr. Bulley will have received seeds of this species and that we shall be able to compare it as a horticultural plant with its ally *Rh. crassum*.

And then there is *Rh. excellens*, Hemsl. et Wilson which the describers speak of as "undoubtedly the grandest of the Chinese Rhododendrons and comparable only with the Indian *Rh. Dalhousiae*, Hk. f. its nearest ally." But *Rh. excellens* is not really a very near ally of *Rh. Dalhousiae*. Its indumentum is



quite different. There are none of the setose hairs of *Rh. Dalhousiae* and the peltate leaf-scales are far apart, leaving a large area of leaf epidermal surface visible. As Hemsley and Wilson point out there is also the absence of scales on the outside of the corolla separating the species and that is an emphatic mark of divergence in this complex. *Rh. excellens* by all characters is one of the group of *Rh. crassum* and stands in it between *Rh. crassum* itself and *Rh. megacalyx*. From the former its oblong leaves and larger calyx sufficiently separate it; from the latter it differs in its longer narrower leaves, lepidote pedicels and calyx-cup, and in its smaller calyx. It has the indumentum of the leaf under-surface of *Rh. megacalyx*. Through the kindness of the Director of the Royal Gardens, Kew, I have been enabled to examine the type sheet of *Rh. excellens* and to compare it with Ward's specimens of *Rh. megacalyx*.

The prominent and easily observed differences are not the only marks of separation from *Rh. crassum*. Close examination of the leaf surface between the scales on the under surface of the leaf will show that the papillae of the epidermis are altogether different. In *Rh. crassum* these papillae are little low cupolas so that the sides of the papillae are divergent and a vallicular interval lies between their tops. Only where there is a scale is there lengthening of the papillae. Beneath the scale fringe the papillae are elongated and inclined towards the stalk of the scale thus increasing as it were their protective value. But in *Rh. megacalyx* the epidermal papillae are vertical rods of some length and their sides are parallel. They are set close together. All these papillae have a granular wax-coat. Further, in *Rh. crassum* the pits on the under side of the leaf in which the scales are set are not very deep; the stalk of the scale brings the umbo to the mouth of the pit on a level with the surface of the adjacent epidermis and the scale fringe has space to spread horizontally as it does. Very different is it in *Rh. megacalyx*. There the pits on the under side of the leaf are deep, the umbo which has very thin cells is not brought to the mouth of the pit on a level with the epidermal surface, there is no room for lateral extension of the fringe of the scale, and it is not only narrower but is turned upwards so that the scale to surface view has a cuplike appearance. That this space relation is in causal connection with the narrowness and direction of the fringe I am not prepared to assert, because the single specimen of young expanding leaves which I have seen suggests that from the outset and before the leaf-surface pits are developed the size and direction of the fringe are determined. The condition is of interest looking to the modification of form of the elements of indumentum in the genus. From

simple hairs one passes to flocks, dendroid forms, fascies, saucers, to chalice and fringed chalice, all of which forms are, within limits, definite group marks.

***Rhododendron mollicomum*, Balf. f. et W. W. Sm.**

Frutex ad 2 m. altus parvifolius virgatus esetulosus. Ramuli hornotini purpurei albo-pubescentes squamis paucis peltatis breviter stipitatis instita angusta cinctis resinosis lepidoti pilis longis contortis coloratis glandulosis carnosulis praediti annis 2–3 post nudi decorticantes et liberum interiorem fibrosum argenteum detegentes. Alabastrorum ovoideorum perulae exteriores late-ovatae vel rotundatae crustaceae extus puberulae et lepidotae margine longe ciliatae intimae oblongae carinatae acutae erubescens indumento eodem margine breviter ciliatae. Folia ad 2.5 cm. longa petiolata; lamina crasse coriacea ad 2 cm. longa ad 7 mm. lata oblonga vel oblongo-obovata apice acutiuscula corneomucronulata margine cartilaginea ciliata admodum revoluta basi subcuneatim obliqua utrinque dense puberula venarum reti costa media excepta occulto supra opaca viridis (costa media paullo sulcata) sub indumenti pilis glandulis paucis rubris conspersa marginem versus tuberculis vestigialibus paucissimis minutissimis praedita subtus pallidior inter pilos indumenti squamis peltatis in foveolas immersis ex umbone magno concavo luteo-vel rubro-resinoso institaque angusta erecta aedificatis induta; petiolus circ. 5 mm. longus indumento paginae inferae vestitus. Inflorescentia ex umbellis 1–2-floris in axillis foliorum ad apices ramorum orientibus spiciformiter constructa; bracteae umbellarum exteriores crustaceo-coriaceae late ovatae vel rotundatae extus adpresso-puberulae et lepidotae, interiores membranaceae spathulatae circ. 1 cm. longae 1.5 mm. latae extus puberulae lepidotae; prophylla circ. 1 cm. longa circ. 1 mm. lata ligulata extus puberula et lepidota; pedicelli circ. 1 cm. longi ramulorum indumento praediti. Calyx extus puberulus et lepidotus crateriformis minutus vix 1 mm. longus margine obscure 5-lobulatus lobulis semilunatis. Corollae obliquae ad 1.7 cm. longae coccineae tubus infundibuliformis extus sparse intus conspicue puberulus in limbum 5-lobatum amplius lobis elliptico-oblongis circ. 7 mm. longis extus lepidotis. Stamina 10 inaequalia longe exserta filamentis tenuibus basi glabris supra basim ad medium puberulis antheris elliptico-oblongis circ. 2 mm. longis. Ovarium subcylindricum 5-sulcatum dense lepidotum et puberulum circ. 3.5 mm. longum; stylus longissimus tenuis stamina multo superans circ. 3 cm. longus in triente infero puberulus; stigma discoideum supra lobulatum. Capsula 1 cm. longa 5 mm. lata subcylindrica fulva puberula et squamis luteo-nitidis lepidota. Semina pallide straminea longitudinaliter striata oblonga saepe

curvata et angulata ad extremitates obscure lobulato-carunculata circ. 1.5 mm. longa.

Species *Rh. spicifero*, Franch. affinis setarum inopia foliis puberulis admodum revolutis diversa.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 10,000–11,000 ft. Shrub of 4–6 ft. Flowers crimson? Open thicket. G. Forrest. No. 10,347. June 1913; No. 11,490. Oct. 1913.

I have not found it easy to discriminate between the two species of Franchet, *Rh. spiciferum*, Franch. and *Rh. scabriusculum* Franch., both of which belong to a series of Rhododendrons with characteristic indumentum. *Rh. mollicomum*, Balf. f. et W. W. Sm. is a very distinct species although in many ways like Franchet's species, but it wants entirely their characteristic rough setae and is smooth and soft all over.

There are two specimens in Mr. Forrest's collections, both from the Chungtien Plateau at 9000–10,000 ft. under Nos. 12,402 and 12,619, which are also this species I believe. They have larger flowers and a more developed calyx, and Mr. Forrest describes the flowers as rose or pale rose without markings.

**Rhododendron monanthum**, Balf. f. et W. W. Sm.

*Rh. sulfureum*, Diels non Franch. in Notes, R.B.G., Edin., v (1912), 66.

Fruticulus ad 1 m. altus patens. Ramuli tenues annotini circ. 1.5 mm. diam. fusi pilosi rufo-lepidoti tandem (in anno quaterno) grisei decorticantes. Alabastrorum perulae annos plures persistentes ovatae oblongae dorso lepidotae margine pilis contortis longis ciliatae. Folia ad 4.5 cm. longa petiolata; lamina elliptica vel oblongo-elliptica vel oblonga ad 4 cm. longa 2.5 cm. lata coriacea apice obtusa abrupte vel subacuminatim corneo-mucronulata margine cartilaginea vix recurvata pedibus setarum delapsarum plus minusve notata basi obtusa vel late cuneata supra subnitida fulvo-viridis dense lepidota venarum reti elevato-reticulata costa media sulcata venis primariis utrinsecus circ. 10 subpatentibus squamarum peltatarum superficialium vestigiis verruculosa subtus olivacea (costa media elevata caeteroquin venarum reti immerso) squamis inaequalibus minoribus et majoribus discontiguis stipite longo umbone lato rufo resinoso convexo institaque integra lata praeditis ex foveolis orientibus atque papillis epidermicis ceriferis longis baculiformibus saepe curvatis notata; petiolus rufo-lepidotus ad 5 mm. longus. Flores solitarii terminales; bracteae paucae crustaceae fulvae late ovatae vel rotundatae apice submucronulatae extus minutissime et uniformiter puberulae apice albo-ciliatae; prophylla filiformia ramentacea brunnea ad 8 mm. longa; pedicellus

robustus ad 5 mm. longus dense lepidotus curvatus. Calyx circ. 2 mm. longus extus dense rufo-lepidotus fere obsoletus cupula margine obscure undulato-lobulata. Corolla lutea campanulata circ. 2.3 cm. longa extus lepidota intus basim versus paullo puberula lobis 5 cordatis vel late ovatis vel ellipticis circ. 8 mm. longis 1 cm. latis imbricatis emarginatis et subcrenulatis. Stamina 10 inaequalia longiora corollam subaequantia filamentis deorsum dilatatis supra basim villosulis antheris oblongis 4 mm. longis. Ovarium conoideum circ. 4 mm. longum dense luteo-lepidotum et pilis paucis conspersum; stylus ultra corollam ad 8 mm. exsertus glaber rectus vel paullo curvatus; stigma lobulatum.

Species *Rh. pachypodo*, Balf. f. et W. W. Sm. affinis foliis minoribus ellipticis indumento diverso calyce epiloso inter notas alias recedit.

Yunnan. Lupo Pass, Mekong-Salween Divide. Alt. 10,000–11,000 ft. Lat. 27° 10' N. Small spreading shrub of 2–3 ft. Flowers bright yellow. Shady situations on the margins of pine forests and cane brakes. G. Forrest. No. 951. Nov. 1905.

An interesting yellow-flowered species distinguished by its solitary terminal flower. Its nearest ally appears to be *Rh. pachypodum*, Balf. f. et W. W. Sm. Both of the species have remarkably thick pedicels and exceptionally long styles. Diels\* referred this plant to *Rh. sulfureum*, Franch. It is not Franchet's species. Apart from the yellow flower-colour they seem to have little in common. See what I say on p. 283 under *Rh. theiouchroum* about gaps in our knowledge of *Rh. sulfureum*.

The peltate scales of the indumentum in this species belong to the type with well-developed umbo and an entire fringe, its margin being quite smooth. I may give a warning here. Many parts of the plant, particularly the leaf-petiole and the stem, appear to be shortly pilose or puberulous—the hairs being black and often issuing from the umbo of the scales. This pilosity is due to a fungus. On the upper leaf-surface in the old leaves—I know nothing of the young leaves—the peltate scales persist and appear as little warts. They have short stalks and are not inserted in pits. On the under surface the scales are of many sizes, some very small, others large, and they have conspicuous stalks arising in pits and bringing the disk of the scale to the surface whence the broad fringe expands. The epidermal papillae are long and rod-like and are often curved. The wax-secretion is not enough to give a white colour to the leaf surface between the scales.

\* Diels in Notes, R.B.G., Edin., v (1911), 66.

**Rhododendron nwaiense**, Balf. f. et Ward.

Frutex ad 1 m. altus in bambusetis et inter rupes crescens ramosissimus parvifolius. Ramuli juniores alabastrorum perulis externis annos plures persistentibus sordide griseis angustis elongato-triangularibus circ. 5 mm. longis carinatis acutis vel acuminatis coriaceis dorso obscure lepidotis margine eciliatis imbricatim obtecti seniores grisei verruculosi decorticantes. Alabastra oblongo-ovoidea acuta paucifolia perulis internis membranaceis subspathulatis obtusis apiculatis ciliatis. Folia crasse coriacea ad 2 cm. longa petiolata; lamina oblonga apice profunde emarginatim recurvata sinu corneo-mucronulato margine revoluta integra subasperata basi cordulata supra atro-viridis squamarum peltatarum juvenilium vestigiis conspersis asperata costa media sulcata caeteroquin venuloso-reticulata rugulosa subtus fusco-ferruginea squamis peltatis longi-stipitatis et brevistipitatis (illis disco lato praeditis stratum super has breviores angustiores facientibus) induta costa media elevata primo dense lepidota tandem fere nuda flavida. Flores sulfurei in umbellae circ. 6-floras parvas terminales rhachi puberula dispositi; bractae late ovatae vel rotundatae apiculatae dorso lepidotae margine ciliatae intus puberulae circ. 5 mm. longae pedicellis longiores; prophylla lineari-claviformia ramentacea extus lepidota margine ciliata circ. 4.5 mm. longa calyce breviora; pedicelli ad 2 mm. longi lepidoti haud puberuli. Calyx fere ad basim in lobos 5 inaequales nunc aequales fissus cupula crateriformi dense lepidota lobis membranaceis viridibus vel rubidis extus dense lepidotis margine lepidoto-fimbriatis lobo antico minimo circ. 3 mm. longo oblongo-obtuso lobis postero-lateralibus saepe in lobum unum latum circ. 4.5 mm. longum apice dentatum connatis. Corollae tenuis obliquae 1.5 cm. longae tubus antice circ. 6.5 mm. longus extus glaber intus pubescens in lobos explanatos latiusculos circ. 5 mm. longos 7 mm. latos extus sparsim lepidotos crenulatos sursum ampliatus. Stamina 5 circ. 5 mm. longa filamentis glabris ad basim expansis, antheris oblongis. Ovarium conoideum 5-lobatum lepidotum circ. 1.5 mm. longum; stylus rectus haud clavatus ad 2 mm. longus ovario longior stigmatibus lobato coronatus.

Species *Rh. gymnomisco*, Balf. f. et Ward proxima alabastrorum perulis persistentibus, foliis saepe emarginatis, pedicellis epuberulis, corolla sulfurea, staminibus glabris, ovario lepidoto, stylo puberulo distinguenda.

E. Upper Burma. Ridge of Naung Chaung. Nwai Divide. Dwarf bushy shrub of 2-3 ft. amongst bamboo brake or in the open amongst granite boulders about 12,000-13,000 ft. Flowers sulphur yellow. Cf. very similar sp. from Doker La, M.S.



Divide. Not seen on M.Y. Divide. F. Kingdon Ward. No. 1791. 16th July 1914.

This plant is nearly allied to the more northern *Rh. gymnomiscum*, Balf. f. et Ward but the two plants are different. They belong to the *Cephalanthum* series but *Rh. gymnomiscum* diverges slightly from the typical form of the series in its indumentum which is more compact not so spongy as is usual in the series (in this resembling one other member of the series *Rh. chamaetortum*, Balf. f. et Ward). They agree in having a reddened calyx without marginal hairs but fringed with scales. The reddening of the calyx occurs also in *Rh. chamaetortum* where it is associated with a slightly ciliate margin but is not common in the *Cephalanthum* series. They agree also in having a style which is longer—only slightly—than the ovary and which does not show the marked clavate enlargement upwards to the stigma as in other species of the *Cephalanthum* series. In the general run of their other characters the species are well within the *Cephalanthum* limit, and they differ from one another in a way which marks their distinctness. The following are easily observed points by which *Rh. nwaiense* is diagnosed from its ally: leaves smaller, of a maximum length of 2 cm.—I should interpolate here that the material of neither of the species is abundant and of *Rh. nwaiense* in particular is rather scanty; the leaves may therefore be larger than the specimens available show—scale-leaves of the vegetative buds narrow-pointed and persistent, fertile bracts much smaller and narrower, bracteoles shorter than the calyx, pedicels lepidote, and corolla lobes outside sparingly lepidote.

*Rh. nwaiense* may be taken as the southern form of what appears in the north as *Rh. gymnomiscum*.

See also p. 316.

### **Rhododendron oresbium**, Balf. f. et Ward.

Suffrutescens parvifolium fastigiatum ramulis plurimis intertextis. Ramuli hornotini circ. 1 cm. longi 1 mm. diam. squamis peltatis intense brunneis verruculosi seniores nigri tandem desquamantes. Alabastrorum parvorum ovoideorum perulae paucae externae ovatae vel rotundatae extus rufo-lepidotae margine submembranaceae minute ciliatae internae oblongo-ellipticae obtusae extus ex toto lepidotae saepe cerasino-lepidotae minutissime ciliatae. Folia parva brevissime petiolata ad 7.5 mm. longa; lamina coriacea oblonga vel elliptica circ. 7 mm. longa 3.5 mm. lata apice rotundata emucronulata margine subplana basi rotundato-obtusa supra atro-viridis albido-furfuracea squamis contiguis persistentibus uniformibus lepidota (squama quaque e stipite pluricellulari umbone convexo flaccido

vix nitente institaque membranacea integra umbone latiore aedificata e foveola profunda oriente) subtus squamis ut supra constructis rufescenti-nitentibus profundius impressis umbone concavo discontinuis vestita ad intervalla esquamosa papillis epidermicis ceriferis quadratis subglauca costa media supra subsulcata subtus paullo elevata venulis caeteris occultis; petiolus vix 0.5 mm. longus brunneo-lepidotus. Flores in umbellam 2-floram terminalem dispositi; alabastra globosa bracteis mox deciduis externis parvis ovatis coriaceis extus lepidotis internis rotundatis cucullatis mucronulatis crustaceo-membraneis extus lepidotis margine ciliatis; pedicelli parvuli circ. 1 mm. longi dense lepidoti. Calyx fere ad basim quinquelobatus cupula parva extus lepidota lobis circ. 1.5 mm. longis aequalibus vel subaequalibus ovatis submembranaceis acutis vel obtusis extus plus minusve lepidotis margine saepe lepidotociliatis apice interdum pilis 1-2 longis terminatis. Corollae lilacinae circ. 1.1 cm. longae extus elepidotae tubus brevis circ. 2 mm. longus intus ad faucem brevissime puberulus, limbi discus concavus circ. 2 mm. latus, lobi rotundati vel oblongo-elliptici circ. 7 mm. longi et lati margine undulati apice rotundati. Stamina 9 (-10?) corollam fere aequantia filamentis validis supra basim intra faucem corollae floccoso-pubescentibus pallidis. Ovarium oblongum albido-lepidotum; stylus purpureus basi puberulus staminibus brevior vel ea vix aequans; stigma lobulatum.

Species fastigiata *Rh. impedito*, Balf. f. et W. W. Sm. affinis sed indumenti subfoliaris squamis fere contiguis stylo staminibus haud longiore distincta.

Tibeto-Yunnan frontier. Doker La. 13,000-15,000 ft. F. Kingdon Ward. No. 541. 1913.

*Rh. oresbium* is one of the Lapponicum series. It resembles *Rh. impeditum*, Balf. f. et W. W. Sm. and other species with discontinuous uniform scales on the leaf under-side and with elepidote corollas, but is distinguished from them all by its style, which is puberulous not glabrous at the base and is not longer than the stamens.

See also p. 300.

### **Rhododendron pachypodum, Balf. f. et W. W. Sm.**

Frutex ad 1.5 m. altus laxe ramosus. Rami hornotini tenues circ. 2 mm. diam. dense rufo-lepidoti epilosi breves. Alabastrorum anguste ovoideorum acutorum perulae externae ovato-acuminatae subcarinatae extus dense rufo-lepidotae internae oblongae angustae subtruncatae apiceque albo-ciliatae. Folia breviter petiolata ad 8 cm. longa epilosa; lamina ad 7.5 cm. longa ad 3 cm. lata lanceolata vel oblanceolata coriacea

crassiuscula apice breviter acuminata margine leviter revoluta basi obtusa vel cuneata supra viridis costa media sulcata caeteroquin reticulata sparsim (juventute copiose) lepidota squamarum stipite in foveam immerso disco fere libero subtus glauca cerifera squamis plurimis nitenti-umbonatis integro-alatis discontiguus rufis ultra fovearum ora projectis paucis majoribus lepidota costa media nervisque primariis utrinsecus 7-9 elevatis pallidis papillis epidermicis petasiformibus; petiolus brevis vix 1 cm. longus rufo-lepidotus. Inflorescentia terminalis umbellata plerumque 3-flora; flores lutei singulo excepto mox decidui. Bractee mox deciduae (non visae); pedicelli breves circ. 1.5 cm. longi robusti circ. 3 mm. diam. dense rufi-lepidoti sub calyce expansi. Calycis lobi 5 crassi rotundati lati nunc deltoidei circ. 2 mm. longi 4 mm. lati extus lepidoti plus minusve hirsutociliati. Corolla anguste campanulata circ. 3.5 cm. longa extus lepidota intus puberula lobis 5 oblongis rotundatis circ. 1.5 cm. latis. Stamina 10 corolla inclusa in dimidio inferiore pubescentia. Ovarium dense rufo-lepidotum; stylus longissimus ad 5 cm. longus stamina longe superans persistens sub fructu plus minusve declinatus ex toto lepidotus vel infra lepidotus superne sparse pilosus; stigma lobatum. Capsula ovoidea ad apicem ramulorum solitaria recta rufo-lepidota circ. 1.5 cm. longa 0.75 cm. diam.

Species *Rh. melinantho*, Balf. f. et Ward, forsan affinis, foliis multo majoribus, pedicello crasso, stylo longissimo recedens.

Yunnan. Western flank of the Tali Range. Lat. 25° 40' N. Alt. 9000-10,000 ft. Shrub of 2-5 ft. In fruit. Open stony pasture and amongst scrub. G. Forrest. No. 11,547. Aug. 1913.

Yunnan. Tali Range, side valleys. Lat. 25° 40' N. Alt. 10,000 ft. Shrub of 2-4 ft. Flowers yellow. In open scrub. G. Forrest. No. 13,512. Aug. 1914.

A most distinct species of the series of lepidote *Rhododendrons* which have a conspicuous wax-coating on the under side of the leaves. Here the epidermal papillae upon the surface of which the wax-granules appear are rod-like and of some length. The lepidote indumentum is on the young leaves abundant on the upper leaf-surface, on the older leaves it may disappear altogether save for a few scales in the groove of the midrib. On the under side the scales are always conspicuous and some of them are larger than the others. Every scale arises in a pit. The pits are somewhat shallower on the upper surface, and those on the lower surface are never more in depth than a quarter of the leaf-thickness. The pits are lined with wax-papillae and the scale has a stout pedicel which is long enough to project the upper part of the scale disk outside the mouth of the pit, conse-

quently the periphery of the disk can grow out as a fringe resting upon the papillate epidermal cells of the adjacent lamina-surface. The fringe is entire, its cells united throughout their whole length and bounded on the outside by a firm regular wall. The umbo is often convex at maturity, and its red secretion gives a scintillating aspect to the leaf-surface. The scales of the pedicels and flower-parts are of the same type but they are not partially sunk in pits.

No other Chinese species with this indumentum has so large leaves as has *Rh. pachypodum*. The name is given in reference to the short and stout pedicel. There is another feature in the flower region deserving of mention. The umbel is few-flowered and apparently only one flower in the umbel sets seeds. On one twig I find two capsules, but usually there is a solitary capsule on the stout pedicel at the end of the flowering twig. The flowers available for examination are unfortunately withered, and the description given above may therefore require modification when better specimens are known. The most conspicuous feature in the flower is the long lepidote style which persists and in fruit is curved downwards from near the base. The style which induced the name *Rh. longistylum*, given by Rehder and Wilson to one of their species—perhaps a distant ally—is only 2.5–3 cm. long, just about half the length of that in our species.

*Rh. pachypodum* is a plant of the Tali Range, and might have been expected to occur amongst the collection of Delavay. But I can find nothing like it, and Mr. Forrest tells me it is a rare plant.

***Rhododendron pagophilum*, Balf. f. et Ward.**

Frutex virgultorum ad 2.5 m. altus ramis dense intertextis late patentibus. Ramuli hornotini glandulis rubris breviter stipitatis dense vestiti annotini purpurei circ. 3 mm. diam. glandulis eisdem quae ad annum quartum vel quintum persistunt praediti vetustiores sordido-grisei. Alabastrorum circ. 1 cm. longorum angustorum elongatorum acutorum perulae externae ovatae acutae ciliatae interiores oblongae vel subspathulatae apice rotundatae vel emarginatae extus pubescentes et glandulosae subviscidae margine pilis rufis simplicibus vel digitatim ramosis subglandulosis dense ciliatim vestitae. Folia parva petiolata ad 7 cm. longa; lamina coriacea oblongo-elliptica vel obovata ad 5.5 cm. longa ad 3 cm. lata apice rotundata abrupte rigide apiculata margine anguste cartilaginea plana basi obtusa vel rotundata supra in juventute atro-viridis epilosa eglandulosa ad maturitatem glabra viridis nitens costa media sulcata venis primariis utrinsecus ad 12 immersis vix areolata, subtus pallidior

in juventute pilis plurimis caulifloris flavidis et rubris induta paucioribus stipitatis digitatim longe ramosis singulatim praedita maturitate costa media straminea elevata caeteroquin subglauca opaca plana venarum reticulo immerso suberubescente conspicuo notata papillis ceriferis epidermicis petasiformibus et pilis minutis caulifloris copiosis subtiliter granulosa hic et illic pilis stipitatis digitatim ramosis conspersa; petiolus ad 1.5 cm. longus atro-purpureus glandulis rubris breviter stipitatis plus minusve vestitus. Flores 3-4 in umbellam veram laxè dispositi rhachi inter bracteas pedicellosque pilis tortuosis simplicibus et digitatim ramosis rufis dense oblecta; bracteae ignotae; pedicelli ad 1.5 cm. longi atrorubentes stricti glandulosi glandulis rubris fere sessilibus sub calyce expansi. Calyx crassus parvus atrorubens circ. 2.5 mm. longus extus glandulosus ad medium in lobos 5 late triangulares glandulis rubris dorsalibus et marginalibus obsitos divisus. Corolla rosea basi intus varo magno dorsali notata infundibuliformis basi subangustata circ. 3 cm. longa extus eglandulosa epilosa intus basi sparsim puberula lobis 5 rotundatis emarginatis circ. 1.3 cm. longis 2.5 cm. latis. Stamina 10 inaequalia longiora corolla paullo breviora filamentis deorsum latioribus tenuiter puberulis. Ovarium conoideum 4.5 mm. longum nigrum (siccitate) glandulis rubris breviter stipitatis dense vestitum; stylus glaber corollam subaequans vel paullo superans; stigma lobulatum haud discoideum stylo paullo latius.

Species *Rh. panteumorpho*, Balf. f. et W. W. Sm. affinis, habitu, foliorum indumento, corolla rosea varo rubro maculata infundibuliformi basi subangustata valde distincta.

Tibeto-Yunnan frontier. Ka-gwr-pw glacier valley. 14,000 ft. Scrub plant forming dense interlacing tangles 5-8 ft. high. On shady slopes with *Picea*. Kingdon Ward. No. 437. June 1913. In Herb. Edin.

Tibeto-Yunnan frontier. Doker La. Boulder scree, forest. 16,000 ft. Kingdon Ward. No. 596. 28th June 1913. In Herb. Edin.

See what I say under *Rh. panteumorphum*, Balf. f. et W. W. Sm. *Rh. pagophilum* is a typical member of the group which includes *Rh. panteumorphum*.

### ***Rhododendron panteumorphum*, Balf. f. et W. W. Sm.**

*Rh. selense*, Diels non Franch. in Notes, R.B.G., Edin., vii (1913), 295.

Frutex ad 1.2 m. altus. Rami annotini circ. 2.5 mm. diam. glandulis rubris globosis vel ellipsoideis fere sessilibus vestiti. Alabastrorum oblongorum angustorum circ. 4 mm. diam. perulae externae spadiceae ovato-rotundatae extus granulosa margine minute ciliolatae interiores elongatae subspathulatae membran-



aceae. Folia petiolata ad 10.5 cm. longa; lamina oblongo-elliptica ad 9 cm. longa ad 5 cm. lata apice rotundata abrupte rigide apiculata apiculo ad 1.5 mm. longo margine plana tenuissime cartilaginea basi rotundata vel subcordulata supra atro-viridis ad maturitatem glabra hic et illic pilorum juvenilium vestigiis aliquando notata costa media paullo elevata sulcataque venis primariis utrinsecus ad 15 impressis caeteroquin subtiliter areolata subtus pallidior olivacea opaca costa media erubescente prominula caeteroquin plana conspicue rubido-venulosa granulosa papillis ceriferis epidermicis petasiformibus pilisque minutis caulifloris flavidis vel rubris conspersis praedita; petiolus validus ad 1.75 cm. longus glaber vel glandulis sparsis praeditus. Flores in umbellam vel racemo-umbellam ad 8-floram laxam dispositi rhachi circ. 5 mm. longa pilis longe stipitatis digitatim ramosis ramulis rubris tortuosis dense oblecta. Bracteae non visae. Pedicelli rubidi circ. 2 cm. longi glandulis rubris breviter stipitatis vestiti sub calyce expansi. Calyx crassus parvus 2.5 mm. longus ruber extus pedicello similis rubro-glandulosus in dentes 5 late triangulares extus margineque rubro-glandulosus ad medium fissus. Corolla lutea circ. 3 cm. longa a basi vere campanulata intus fundo puberula extus eglandulosa epilosa lobis 5 rotundatis circ. 1.2 cm. longis 1.5 cm. latis emarginatis. Stamina 10 inaequalia longiora vix corolla breviora filamentis deorsum latioribus et puberulis. Ovarium (siccitate) nigrum circ. 3.5 mm. longum glandulis rubris fere sessilibus (quasi in costa media cujusque carpelli tantum) sparsissime praeditum; stylus glaber corollam paullo superans; stigma parvum lobulatum stylo vix latius.

Species olim cum *Rh. selensi*, Franch. confusa a qua corolla lutea staminibusque puberulis satis differt; *Rh. Wardii*, W. W. Sm. aliquantum affinis sed calyce parvo, filamentis puberulis, stylo eglanduloso divergens.

Yunnan. Marshy mountain meadows on the Mekong-Salween Divide north-west of Tsekou. Lat. 28° 5' N. Alt. 11,000–12,000 ft. Shrub of 2–4 ft. Flowers yellow. Forrest. No. 5068. Sept. 1904. In Herb. Edin.

Yunnan. Père Monbeig. No. 12. In Herb. Kew.

*Rh. panteumorphum* is one of those Chinese Rhododendrons possessing medium-sized leaves of a more or less elliptic shape, sometimes oblong elliptic, approaching rounded, with rounded or cordulate base and with funnel-shaped flowers in loose trusses, the styles always glabrous. All of them give promise of being effective garden plants. The under surface of the leaves in all of them appears to casual observation to be glabrous, but in them, as in such Himalayan forms as *Rh. Thomsoni*, Hook. f. and *Rh. campylocarpum*, Hook. f., the under surface is studded

more or less with glands which are stalked and have clavate greasy summits sometimes branched, and these glands are coloured yellow or red. There are several such Chinese species in addition to *Rh. panteumorphum*; for instance, *Rh. pagophilum*, Balf. f. et Ward, *Rh. jucundum*, Balf. f. et W. W. Sm., *Rh. selense*, Franch. Some of them have been hitherto misnamed *Rh. Souliei*, Franch. That species is the centre of a series with open corolla and glandular style—easily recognised characters seen also in *Rh. puralbum*, Balf. f. et W. W. Sm., *Rh. Wardii*, W. W. Sm., *Rh. Williamsianum*, Rehder et Wilson.

*Rh. panteumorphum* is the plant named *Rh. selense*, Franch. in *Plantae Forrestianae* by Diels. It is not Franchet's species. Its fine yellow corolla readily distinguishes it.

***Rhododendron platyphyllum*, Balf. f. et W. W. Sm.**

*Rh. cephalanthum*, Franch. var. *platyphyllum*, Franch. mss.  
ex Diels in Notes, R.B.G., Edin., v (1912), 211.

Frutex aromaticus ad 1.5 m. altus subdivaricatum et tortuose ramosus. Ramuli hornotini fulvi squamis longius et brevius stipitatis dense furfuraceo-lepidoti vetustiores primo squamis integris nigricantibus et squamarum decapitatarum stipitibus porriginosi quasi-setulosi deinde subscabridi grisei decorticantes alabastrorum perulis externis sublignosis annos plures persistentibus verticillatim inter se distantibus praediti. Alabastrorum oblongo-ovoideorum perulae externae circ. 8 mm. longae crustaceo-coriaceae late ovatae carinatae apiculatae dorso lepidotae margine setuloso-ciliatae interiores deciduae tenues membranaceae flavidae ovatae vel subspathulatae margine hirsuto-ciliatae extus lepidotae intus puberulae ad 2.5 cm. longae 1 cm. latae. Folia ad 5.5 cm. longa petiolata; lamina oblonga vel oblongo-elliptica vel elliptica ad 5 cm. longa 2.5 cm. lata coriacea apice obtusa saepe emarginatim recurvata corneo-mucronata (in juventute costa media longe excurrente) margine cartilaginea paullo revoluta obscure undulata vel minute crenulato-denticulata hirsuto-setulosa vel setarum pedibus punctulata basi obtusa supra olivacea glabrescens costa media sulcata venis primariis utrinsecus circ. 8 paullo sulcatis caeteroquin areolatim rugulosa squamarum juvenilium vestigiis obscure conspersa (in juventute atrorubens et squamis latis lepidota) subtex cinnamomea porriginosa costa media elevata straminea laxa lepidota venarum reti caeteroquin occulto indumenti squamis longe stipitatis disco spadiceo ex umbone institaque lata fimbriata aedificato stratum superius construentibus squamas brevi-stipitatas incoloratas obtegentibus; lamina juvenilis dense luteo-lepidota; petiolus circ. 5 mm. longus crassus lepidotus et quasi-setulosus. Flores lactei circ. 8 in umbellam veram termi-

nalem subcapitatum dispositi; bracteae steriles late ovatae acuminatim apiculatae ad 1 cm. longae extus lepidotae margine minute ciliatae intus puberulae fertiles obovatae vel obovato-spathulatae ad 1.2 cm. longae 6 mm. latae membranaceae extus lepidotae margine minutissime ciliatae deciduae; prophylla circ. 1 cm. longa membranacea calyce longiora claviformia circ. 1 mm. lata dorso lepidota margine minute ciliata; pedicelli circ. 4 mm. longi lepidoti epilosii. Calyx circ. 5 mm. longus poculiformis fere ad basim in lobos 5 subaequales erectos fissus cupula lepidota lobis membranaceis dorso lepidotis ad apicem pilis longis sparsissime praeditis. Corolla circ. 2 cm. longa tubo extus glabro intus dense villosulo sursum in limbum amplum obliquum 5-lobatum explanato lobis subaequalibus rotundatis circ. 1 cm. diam. crenulatis. Stamina 5 tubo corollino inclusa circ. 6 mm. longa filamentis deorsum dilatatis basim versus minutissime puberulis antheris oblongis circ. 1.5 mm. longis. Ovarium 1.5 mm. longum lobatum dense luteo-lepidotum; stylus viridis clavatus glaber ovarium aequans stigmate lobato coronatus.

Species *Rh. cephalantho*, Franch. valde affinis foliis latioribus ad 2.5 cm., perulis persistentibus late ovatis, prophyllis calyce longioribus ciliatis haud villosis, calyce brevior apice sparsim longe ciliato haud villosulo, corollae tubo latiore brevior, limbo ampliato explanato, lobisque majoribus recedit.

Yunnan. Dry exposed ledges of cliffs on the eastern flank of the Tali Range. Alt. 10,000–11,000 ft. Lat. 25° 40' N. Shrub of 2–5 ft. Flowers pure white. Foliage strongly aromatic. G. Forrest. No. 4155. Aug. 1906.

Yunnan. Tali Range. Alt. 10,000 ft. Lat. 25° 40' N. Shrub of 3–4 ft. Flowers membranous creamy white, occasionally faintly flushed rose on exterior. On ledges of cliffs and in bamboo brakes. G. Forrest. No. 11,730. June 1913.

Yunnan. Tali Range. Lat. 25° 40' N. G. Forrest. No. 13,526. July 1914.

Dr. Diels attached the name *Rh. cephalanthum*, Franch. var. *platyphyllum*, Franch. to Forrest's specimen No. 4155, and under the name the plant is recorded in *Plantae Forrestianae*.<sup>\*</sup> There has been no other publication of the name, to my knowledge. From Dr. Diels it has been learned that he found the name written by Franchet on a sheet in the Paris Herbarium and adopted it, as he did in several other like instances. From the facts one may conclude that Franchet intended to mark the plant as different from *Rh. cephalanthum*, Franch., but circumstances did not permit of his making critical examination of it,

<sup>\*</sup> Notes, R.B.G., Edin., v (1911), 211.

and he published no description. Had he been able to do so he would have seen that the differences which analysis brings out are pronouncedly specific.

*Rh. platyphyllum* finds undoubtedly its nearest ally in *Rh. cephalanthum*, and if the size of its leaves is the most evident difference between the two species it is supported by many other differential characters which are not difficult to observe. *Rh. cephalanthum* is one of the species of small-leaved Rhododendrons which retain for several years the outer leaf-bud scale-leaves. These cover more or less the branches and are sharp-pointed with prominent dorsal rib, showing the remains of the indumentum and marginal hairs that coated them at an earlier period. In *Rh. platyphyllum* we have the same persistence of leaf-bud scale-leaves, but the scale-leaves are broadly ovate or rounded with or without a keel and only apiculate. In the young condition the difference between the scale-leaves is extremely marked. Whilst those of *Rh. cephalanthum* have shaggy margins those of *Rh. platyphyllum* are minutely ciliate. The bracteoles (prophylla) are diagnostic. In *Rh. cephalanthum* they are shorter and broader, reaching only about half way up the calyx; in *Rh. platyphyllum* they exceed in length the calyx. The flowers of the two species are no less different. *Rh. cephalanthum* has a campanulate slightly patent calyx which is some 8 mm. long about one-third the length of the corolla, its lobes are shaggy, often erose, the corolla has a long tube, and the lobes are only about 5 mm. broad more or less erecto-patent; whilst in *Rh. platyphyllum* the calyx is cup-shaped with lobes about 5 mm. long about one-quarter the length of the corolla, and these which may also be erose have only a few longish hairs at the top; the corolla has a short tube with lobes about 1 cm. long which apparently are flat or even repand.

See also p. 316.

#### **Rhododendron praeclarum, Balf. f. et Farrer.**

Fruticulus parvus decumbens divaricatus ramosissimus. Ramuli annotini circ. 1 mm. diam. dense fusco-lepidoti vetustiores squamarum vestigiis sordidis vestiti tandem cinerei decorticantes corticem interiorem flavido-cinereum detegentes. Alabastrorum ovoideorum parvorum obtusorum perulae mox deciduae externae rotundatae spadiceo-brunneae paucae subcarinatae circ. 5 mm. longae dorso lepidotae minutissime albociliolatae interiores fuscae spathulatae obtusae ad 6 mm. latae squamis paucis latis dorso lepidotae apicem versus minute puberulae margine longe ciliatae. Folia crasse coriacea petiolata ad 2.5 cm. longa; lamina elliptica vel oblongo-elliptica circ. 2 cm. longa 1 cm. lata apice obtusa mucrone longo terminata

marginē vix revoluta integra subasperata basi obtusa vel late cuneata vel subrotundata supra atro-viridis squamarum juvenilium citrinarum vestigiis conspersis obscure pulverulenta costa media sulcata caeteroquin reticulatim rugulosa subtus cinnamomea indumento squamarum peltatarum longius stipitatarum discis latis in stratum sublaxum uniforme superficiale squamas breviter stipitatas obtegens dispositarum induta costa media primo omnino lepidota deinde subnuda (lamina juvenilis utrinque citrino-lepidota eciliata margine squamulis asperata); petiolus circ. 4 mm. longus cinnamomeus lepidotus. Flores in umbellas capituliformes terminales ad 8-floras congesti; bracteae exteriores rotundatae circ. 5 mm. diam. ecarinatae crassae extus densissime lepidotae ala angusta submembranacea limbatae margine minutissime ciliolatae interiores coriaceae haud membranaceae spadiceo-brunneae late spatulatae ad 7 mm. longae 4 mm. latae dorso medio virides lepidotae margine ciliatae; prophylla lineari-claviformia ramentacea puberula dorso apicem versus sparsim lepidota margine ciliata calycem aequantia ad 6 mm. longa; pedicelli circ. 1.5 mm. longi lepidoti. Calyx poculiformis ad 4 mm. longus ultra medium fissus extus dense lepidotus viridis lobis membranaceis subaequalibus oblongis acutis vel obtusis intus glabris margine apiceque lepidoto-fimbriatis eciliatis. Corollae paullo obliquae lepidotae circ. 1.4 cm. longae tubus antice circ. 8 mm. longus extus glaber intus plus minusve villosulus in limbum latum 5-lobatum expansus lobis subellipticis subaequalibus circ. 5 mm. latis crenulatis. Stamina breviter circ. 4 mm. longa filamentis deorsum paullo dilatatis glabris antheris rufis oblongis 1 mm. longis. Ovarium circ. 1.5 mm. longum ovoideum lobatum lepidotum; stylus ovario paullo brevior clavatus flavidus stigmatē lobato coronatus.

Species nova *Rh. cephalantho*, Franch. affinis foliorum indumento minus laxo, floribus flavis, prophyllis calycem aequantibus, inflorescentiae rhachi puberula, pedicellis lepidotis brevibus, calycis lobis viridibus lepidotis margine lepidoto-fimbriatis, corolla glabra, staminum filamentis glabris, stylo quam ovarium brevius notata.

Kansu. A decumbent straggling little plant on cool rock surfaces and mossy banks about beck-gullies high up on the Thundercrown Range, but not common till you get to Lotus Mountain and the main Min San. Farrer. F. 88. 20th June 1915.

I expected this plant coming from Kansu would prove to be *Rh. anthopogonoides*, Maxim. which was collected by Przewalski in 1872, but Mr. Farrer's plant is very different. It has smaller leaves and their indumentum is much more that of the



Cephalanthum series, and yet it is not so loose and spongy as is typical there. The broad disks of the scales are very beautifully seen in this new species. The colour of the indumentum is darker (on the way to rufescent) than in any other species of the series. The flowers are bright yellow as they are in *Rh. gymnomiscum*, Balf. f. et Ward, *Rh. nwaïense*, Balf. f. et Ward and in *Rh. Sargentianum*, Rehder et Wilson of the series. The large leathery bracts with broad soft scales on the back are characteristic, and it is one of the species that has a puberulous rhachis to the inflorescence and lepidote short pedicels. The calyx is distinctive from most species of the series the lobes having a lepidote margin. The stamens have glabrous filaments, and the style is shorter than the ovary.

I hope Mr. Farrer has introduced to cultivation this beautiful little species.

See also p. 316.

***Rhododendron praestans*, Balf. f. et W. W. Sm.**

Frutex grandifolius ad 9 m. altus ramis ultimis crassis. Ramuli juveniles circ. 7.5 mm. diam. albidī laeves indumenti strato nitente obtecti vetustiores indumenti vestigiis conspersi. Alabastra ignota. Folia magna petiolata ad 35 cm. longa; lamina crasse coriacea longe cuneata a regione latissima prope apicem deorsum attenuata apice rotundata margine cartilaginea vix revoluta basi stricte cuneata supra viridis glabra costa media lata venisque primariis utrinsecus circ. 13 sulcatis subtus albidā nitens costa media venisque primariis elevatis reticulo ultimo occulto ubique strato compacto crustiformi tenui uniformi persistente ex pilis floccoso-ramosis pede colorato brevissimo ramulisque latis longis unicellularibus vacuis vesiculosis intertextis aedificato vestita; petiolus crassus circ. 2 cm. longus indumento albedo obtectus mox glabrescens. Flores laxē racemoso-umbellati, inflorescentiae circ. 12-florae, rhachis circ. 4 cm. longa plus minusve rubiginoso-tomentosa. Bractee fertiles ligulatae vel subspathulatae extus glabrae intus tomentosae; pedicelli circ. 5 cm. longi rubiginoso-tomentosi ad apicem sub calyce oblique expansi. Calyx parvus plus minusve tomentosus lobis inaequalibus deltoideis vel subrotundatis circ. 2 mm. longis. Corolla carnosula circ. 4 cm. longa late campanulata tubo circ. 3 cm. longo basi gibboso lobis 8 rotundatis emarginatis circ. 1 cm. longis 1.5 cm. latis. Stamina 16? inclusa filamentis glabris. Ovarium oblongum dense fasciatim ochraceo-tomentosum eglandulosum; stylus corolla brevior. Capsula vix curvata circ. 4 cm. longa 1 cm. lata rubiginoso-tomentosa. Semina oblonga complanata ala angusta arillata circ. 2.5 mm. longa pallide straminea.

Species *Rh. sino-grandi*, Balf. f. et W. W. Sm. proxima foliis longe cuneatis breviterque petiolatis, pedicellis longioribus tenuioribus minus tomentos distincta.

Yunnan. Kari Pass. Mekong - Yangtze Divide. Lat. 27° 40' N. Alt. 13,000 ft. Shrub of 20-30 ft. Flower? In rhododendron forests. Forrest. No. 13,023. Aug. 1914.

A large-leaved species, of which we hope to learn more from cultivated plants than is possible from the two specimens collected by Mr. Forrest, one with ripe fruits, the other passing into fruit and with withered flowers. It is a species of the Grande group, having the characteristically veined leaves with white indumentum of floccose interwoven hairs forming a shining crust-like coating on their under side. The long cuneate leaves separate it from its Chinese ally *Rh. sino-grande*, Balf. f. et W. W. Sm., as also from the two Indian species of the group, the Nepal, Sikkim, and Bhutan *Rh. grande*, Wight, and the Manipur *Rh. Macabeanum*, Watt. *Rh. grande* is a wonderfully constant type in form of leaf—long oblong leaves always widest at the middle. *Rh. Macabeanum* has wider leaves than *Rh. grande* and they may become somewhat rotund but seem to be always widest at the middle. *Rh. sino-grande* also is consistent with this type, only in one large leaf have I seen the tendency to obovate showing. Here in *Rh. praestans*, Balf. f. et W. W. Sm. the leaves are always widest close to the apex and then taper gradually and regularly in cuneate fashion to the base. The inflorescence is much less compact than in *Rh. sino-grande*, the rhachis is longer, the pedicels thinner, and they as well as the calyx are much less tomentose than in *Rh. sino-grande*.

The corolla in our specimens is much shrivelled and is attacked by an Ascomycete which has formed its small round black fructifications all over the surface. These in the dried state shrink from their summit into cup-like disks extremely like, and at first glance to be mistaken for, the scales which appear so abundantly on the corollas of many species of Rhododendron, making them quite lepidote. The disease is one affecting many species of Rhododendron.

*Rh. praestans* may be regarded as the northern representative in Yunnan of the southern *Rh. sino-grande*.

### **Rhododendron proteoides**, Balf. f. et W. W. Sm.

Fruticulus robustus ad 1 m. altus subdichotome et tortuose ramosus. Ramuli crassi internodis brevissimis, foliis perulisque alabastrorum annos 3-4 persistentibus ex toto dense vestiti deinde illorum vestigiis per annos plurimos obtecti tandem decorticantes. Alabastrorum perulae persistentes exteriores late ovatae apiculatae extus margineque plus minusve rufo-

lanatae interiores ramentaceae brevissime petiolatae lanceolatae margine rufo-lanatae. Folia circ. 4.5 cm. longa crassissime coriacea petiolata; lamina oblonga ad 4 cm. longa ad 1 cm. lata apice obtusa (costa media in tuberculum corneum apice revolutum occultum excurrente) margine admodum revoluta basi paullo attenuata supra laete viridis costa media venisque primariis utrinsecus circ. 10 sulcatis areolatim rugulosa glabrescens sed pilorum juvenilium stipitibus conspersa subtus indumenti lanati rufi persistentis strato 1-2 mm. crasso ex toto oblecta indumenti pilis robuste breviterque stipitatis apice in filamenta contorta intricatim intertexta copiose ramosis costam mediam elevatam omnino obtegentibus; petiolus crassus latus usque ad 5 mm. circ. 5 mm. longus indumenti rufi strato ad 2 mm. diam. tunicatus. Flores in umbellas 8-floras terminales aggregati; bractae exteriores persistentes crustaceae late ovatae vel rotundatae carinatae plus minusve apiculatae vel subacuminatae dorso margineque subluteae fuscolanatae fertiles citrinae deciduae subspathulatae ad 2 cm. longae extus intusque fusco-sericeae; prophylla ramentacea citrina pubescentia anguste ligulato-claviformia circ. 1 cm. longa pedicellum aequantia; pedicelli crassi circ. 1 cm. longi (sub fructu ad 1.5 cm.) tunica lanuginosa 1 mm. crassa pallide lateritia oblecti. Calyx atro-purpureus fere obsoletus circ. 1.5 mm. longus cupula extus glabrescente vel puberula lobis deltoideis vel sublunatis vel subrotundatis apice margineque longe pilosis. Corolla citrina coccineo-maculata infundibuliformis circ. 2 cm. longa tubo extus glabro intus basi obscure puberulo sursum in limbum 5-lobatum expanso lobis inaequalibus posticis rotundatis circ. 8 mm. longis 1.2 cm. latis emarginatis subcrenulatis. Stamina 10 inaequalia corollae tubum subaequantia filamentis deorsum dilatatis a basi ad medium minute puberulis, antheris parvis circ. 1 mm. longis. Ovarium pilis longis fasciatim ramosis pallide lateritiis glandulisque claviformibus brevioribus vestitum circ. 2.5 mm. longum; stylus glaber tenuis staminibus longior corolla brevior apicem versus dilatatus stigmate lobulato coronatus. Capsula nigra vel atro-rubens tomento lanato destituta plus minusve oblecta basi calyce aucto ad 3 mm. longo lobis rubris late ovatis inclusa circ. 1 cm. longa 5 mm. lata. Semina oblonga longitudinaliter striata circ. 1.5 mm. longa straminea ecarunculata.

Species bene distincta *Rh. Roxieano*, G. Forrest affinis sed foliis brevibus obtusis et floribus citrinis facile recognoscenda.

Yunnan. Mekong-Salween Divide. Alt. 12,000-13,000 ft. Lat. 28° 14' N. Shrub of 2-3 ft. Flowers pale canary yellow, with crimson markings. Open situations amongst boulders and

on ledges of cliffs. G. Forrest. No. 13,348. Sept. 1915; in fruit. No. 13,470. Oct. 1914.

One of the most striking species in Forrest's collection. The thick coriaceous leaves with the dense coating of bright rufous indumentum tells of a dry environment. The leaves are so much reflexed at the margin that only a narrow strip of the under-leaf surface covered with the rufous wool is visible. The hairs of the indumentum are much contorted and interwoven, and come off in bunches from a thick pedicel which swells up into a knob whence the branches take origin. The hairs easily separate from the stalk. The same kind of indumentum is seen in *Rh. Roxieana*, G. Forrest, the nearest ally of our plant, and there too the leaf margins are much reflexed, but the blunt rounded leaf apices of *Rh. proteoides* diagnose it readily. *Rh. proteoides* is said to have canary-coloured flowers, and for this should be in cultivation a more desirable plant than *Rh. Roxieanum*, which has whitish and rose flowers.

**Rhododendron puralbum**, Balf. f. et W. W. Sm.

Frutex virgatus ad 4.5 m. altus. Ramuli hornotini glabri annotini virides ad 3 mm. lati vetustiores grisei. Alabastrorum parvorum circ. 8 mm. longorum oblongorum perulae intermediae firmae late ovatae apiculatae glabrae margine minutissime ciliolatae. Folia longe petiolata ad 9 cm. longa; lamina chartacea ad 7.5 cm. longa ad 4 cm. lata anguste oblongo-ovata apice subacuta rigide mucronata margine anguste cartilaginea plana basi truncata nec cordata supra in juventute pilis floccosis vel stipitatis et digitatim ramosis sparsim conspersa maturitate atro-viridis glabra saepe vestigia pilorum juvenilium exhibens obscure areolata costa media leviter sulcata venis primariis utrinsecus ad 9 impressis subtus ab initio pilis minutis brevissimis caulifloris albis vel flavido-rubris praedita pallidior opaca costa media ad basim elevata caeteroquin laevis venarum reti ultimo rubro-tincto conspicuo epidermide in papillas globosas excreta; petiolus ad 2.5 cm. longus eglandulosus rubro-viridis. Flores in umbellam 8-floram terminalem dispositi. Alabastra florum ignota. Pedicelli rigidi circ. 4 cm. longi glabri vel glandulis rubris parvis fere sessilibus paucis conspersi sub calyce paullo expansi. Calyx muscoso-viridis ad 8.5 mm. longus 5-lobatus basi cupuliformis glandulis rubris brevissime stipitatis paucis conspersus lobis membranaceis venulosis inaequalibus maximis circ. 6 mm. longis 5 mm. latis rotundatis vel oblongo-rotundatis margine glanduloso-ciliatis dorso basi nunc glandulosis. Corolla alba a basi late pateriformis circ. 4 cm. longa extus elepidota epilosa intus glabra lobis 5 brevibus circ. 1.5 cm. longis 3 cm. latis rotundatis undulatis subemarginatis. Stamina

10-12 inaequalia parte integra corollae breviora filamentis deorsum latioribus et minutissime puberulis antheris latis 2.5 mm. longis. Ovarium (in siccitate) nigrum conoideum circ. 4 mm. longum glandulis rubris elevatis breviter stipitatis obtectum; stylus corolla triente brevior staminibus longior ex toto rubroglandulosus; stigma parvum lobulatum.

Species *Rh. Souliei*, Franch. affinis, foliis chartaceis non coriaceis anguste oblongo-ovatis nunquam cordatis, papillis epidermicis ceriferis globosis, petiolis eglandulosus, corolla alba pura, staminum filamentis minutissime puberulis diversa; *Rhododendro Wardii*, W. W. Sm. etiam similis sed foliis oblongo-ovatis non cordulatis apice subacutis, papillis epidermicis, corolla puralba recedens.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 11,000 ft. Shrub of 12-15 ft. Flowers pure white. In rhododendron and mixed scrub. Forrest. No. 10,616. July 1913.

Yunnan. Mountains west of Fengkow. Lat. 27° 40' N. Alt. 14,000 ft. Flowers pure white. Forrest. No. 12,698. June 1914.

This charming species should be a valuable horticultural acquisition. It is a much larger plant than its allies *Rh. Souliei*, Franch. and *Rh. Wardii*, W. W. Sm. We have seedlings.

### **Rhododendron pycnocladum**, Balf. f. et W. W. Sm.

Suffrutex parvifolius nanus patens ad 1 m. altus ramosissimus ramulis brevibus lignosis. Ramuli annotini circ. 1-2 cm. longi 1.25 mm. diam. squamis peltatis ferrugineis dense porriginosis seniores sordide grisei mox decorticantes. Alabastrorum parvorum circ. 3.5 mm. longorum oblongo-ovoideorum perulae paucae exteriores ovatae extus ferrugineo-lepidotae interiores subspathulatae vel rotundatae cucullatae subalbidae dorso rufolepidotae margine lanato-ciliatae. Folia petiolata crasse coriacea ad 1.2 cm. longa; lamina elliptica vel oblongo-elliptica circ. ad 1 cm. longa ad 6 mm. lata apice rotundata mucrone decurvo terminata margine leviter revoluta basi obtusa vel late cuneata vel subrotundata supra atro-viridis canescens squamis peltatis fere contiguis persistentibus uniformibus induta (squamarum instita albida umbone plus minusve luteo-nitente) subtus laete brunnea punctata squamis peltatis biformibus contiguis persistentibus plerisque adpressis umbone depresso resinoso-nitido institaque albida paucis majoribus conspersis longius stipitatis umbone institaque brunneis oblecta; petiolus circ. 2 mm. longus squamis furfuraceus. Flores haud fragrantés solitarii terminales. Alabastra globosa bracteis rotundatis cucullatis extus lepidotis margine ciliatis. Pedicelli breves lepidoti



vix 1.5 mm. longi. Calyx circ. 3.5 mm. longus fere ad basim 5-lobatus lobis oblongis aequalibus vel inaequalibus obtusis viridibus vel rubro-purpureis dorso margineque lepidotis ciliatis vel eciliatis. Corollae caesiae circ. 1 cm. longae extus lepidotae tubus latus poculiformis basi subventricosus circ. 2 mm. longus ad faucem albo-villosus in limbum ampliatum patenter expansus disco circ. 2 mm. lato lobis oblongis undulatis circ. 6 mm. longis. Stamina 10 corolla breviora filamentis pallide purpureis supra basim ad faucem corollae albovillosis. Ovarium pallide viride canescenti-lepidotum; stylus glaber purpureus corolla staminibusque longior; stigma lobulatum. Capsula circ. 5 mm. longa calyce aucto inclusa 5-valvata.

Species fastigiata foliis ellipticis supra atro-viridibus subtus brunneis squamis contiguis biformibus praeditis, corolla extus lepidota distinguenda.

Yunnan. Dry ledges and clefts of limestone cliffs on the eastern flank of the Lichiang Range. Lat. 27° 10' N. Alt. 10,000–11,000 ft. Spreading dwarf shrub of 2–3 ft. Flowers blue lavender, base of corolla white, non-fragrant. Forrest. No. 2181. May 1906.

Yunnan. On ledges of limestone cliffs and humus-covered boulders. Eastern flank of the Lichiang Range. Alt. 11,000 ft. Lat. 27° 30' N. Shrub of  $\frac{1}{2}$ –3 $\frac{1}{2}$  ft. Flowers purplish blue. Forrest. No. 5879. June 1910.

This species is very distinct within the Lapponicum series of Rhododendrons. Its short-twigged growth gives it a habit distinct from *Rh. diacritum*, Balf. f. et W. W. Sm., *Rh. drumonium*, Balf. f. et Ward, and *Rh. telmateium*, Balf. f. et W. W. Sm., with which by technical characters of indumentum and flower it may be associated. It is like these, one of a small group of Rhododendrons which have contiguous bicolour punctulate scales on the under-leaf surface which is here bright brown in tint.

See also p. 300.

#### **Rhododendron radinum**, Balf. f. et W. W. Sm.

Fruticulus nanus ravenus ad 6 dm. altus parvifolius copiose ramosus. Ramuli hornotini circ. 1 mm. diam. squamulis longe stipitatis flavido-albidis porriginosis annotini griseo-fulvi stipitibus albidis squamarum decapitatarum setuloso-hirsuti tandem grisei decorticantes. Alabastrorum elongato-ovoideorum perulae persistentes externae angustae a basi lanceolatae acutae vel acuminatae carinatae extus lepidotae margine ciliatae circ. 3 mm. longae 1 mm. latae interiores membranaceae ligulatae ad 6 mm. longae 1 mm. latae longe ciliatae. Folia angusta ad 2.4 cm. longa petiolata; lamina lineari-lanceolata vel oblanceolata ad 2 cm.

longa ad 5 mm. lata apice obtusa mucronulata margine revoluta basi gradatim in petiolum brevem ad 4 mm. longum lepidotum attenuata, supra atro-viridis squamis siccis umbone citrino institaque fimbriata albida plus minusve pulverulentum oblecta quasi subasperata costa media subsulcata caeteroquin reticulo occulto, subtus pallide alutacea subspongiosa squamis contiguus inaequaliter stipitatis porriginosa plurimis longioribus umbone institaque latis stratum superius facientibus caeteris pallidioribus in stratum inferius dispositis costa media prominula. Flores roseo-albi in umbellas parvas multifloras breviter racemose capituliformes terminales rhachi puberula congesti inter ramulos hornotinos subflorales praecoces immersi; bractee externae coriaceae fulvae ovatae subacuminatae extus lepidotae margine ciliatae intus glabrae interiores subrotundatae ad 4 mm. longae subcoriaceae cucullatae extus lepidotae margine ciliatae; prophylla spatulata ramentacea circ. 3 mm. longa calycem subaequantia uninervia subcarinata 3 mm. longa 1 mm. lata extus lepidota margine ciliata; pedicelli subnulli. Calyx viridis parvus circ. 2 mm. longus irregulariter fere ad basim vel ad medium 5-fissus lobis inaequalibus subquadratis membranaceis extus lepidotis margine ciliatis intus glabris. Corollae carnosulae extus lepidotae circ. 1 cm. longae tubus obliquus brevis circ. 6 mm. longus intus sparsim pubescens, lobi 5 rotundati explanati circ. 3 mm. longi imbricati paullo crenulati. Stamina 5 inclusa filamentis deorsum dilatatis glabris, antheris rufescentibus oblongis 0.5 mm. longis. Ovarium ovoideum 2 mm. longum 5-lobatum squamis albidis parvis contiguus lepidotum; stylus vix 0.5 mm. longus clavatus stigmatibus 5-lobato albido coronatus.

Species tenuifolia ex affinitate *Rh. cephalanthi*, Franch. partibus omnibus minoribus diversa.

Yunnan. Lichiang Range. Alt. 11,000–12,000 ft. Lat. 27° 30' N. Dwarf shrub of 1–2 ft. Flowers white flushed rose. Open alpine pasture on the margins of pine forests. G. Forrest. No. 10,278. June 1913.

*Rh. radinum*, Balf. f. et W. W. Sm. is an easily recognised species of the *Cephalanthum* series. It is one of the narrow-leaved members of the series, resembling particularly forms of *Rh. ledoides*, Balf. f. et W. W. Sm. and *Rh. sphaeranthum*, Balf. f. et W. W. Sm. From the former its pointed persistent foliage-bud scale-leaves, nearly sessile flowers, lepidote corolla, glabrous stamens, and style much shorter than the ovary distinguish it. From the latter its foliage-bud scale-leaves are a distinctive mark as well as its short inner bracts and short prophylls, puberulous pedicels, sessile flowers, and glabrous filaments to the stamens.

See also p. 316.

**Rhododendron ravum**, Balf. f. et W. W. Sm.

Frutex ad 3.5 m. altus ramis strictis erectis infra efoliatis. Rami juveniles circ. 3 mm. diam. stratis duobus squamarum peltatarum dense porriginosis substrati albidis squamis adpressis superstrati paucioribus pallide brunneis stipitatis extrusis, in anno secundo saepe rubescentes, in tertio cinerei cortice desquamante. Alabastrorum ovoideorum perulae exteriores ovatae acuminatae ciliatae interiores latae rotundatae carinatae breviter acuminatae vel truncatae et mucronulatae extus lepidotae intus plus minusve sericeae, intimae ligulatae membranaceae apice expansae extus lepidotae margine pilis longis patentibus ciliato-fimbriatae. Folia petiolata; lamina ad 7 cm. longa ad 2.5 cm. lata oblonga vel oblongo-elliptica apice obtusa distincte mucronata margine cartilaginea leviter crenulata pilis contortis paucis (mox deciduis) praesertim basim late cuneatam versus obsita, pagina superiore atro-viridi squamis peltatis argenteis contiguis uniformibus oblecta, inferiore operta denso nitente squamarum imbricarum uniformium primo argenteorum demum ochracearum occulta, costa media supra sulcata subtus prominula squamis laxioribus vestita venis primariis utrinque occultis; petiolus ad 1.5 cm. longus plerumque brevior dense lepidotus nonnunquam pilos contortos paucos gerens. Umbella terminalis 3-4-flora; bractae dense pubescentes; pedicelli validi circ. 6 mm. longi sub calyce lepidoti; prophylla filiformia pedicellos aequantia. Calyx circ. 9 mm. longus basi cupularis lobis 5 aequalibus vel subaequalibus circ. 7 mm. longis (sub fructu ad 1 cm. accrescentibus) 4 mm. latis membranaceis ligulatis viridibus conspicue carinatis extus lepidotis margine pilis longis circumcirca ciliatis. Corolla extus lepidota circ. 2.5 cm. longa profunde fissa tubo circ. 8 mm. longo cylindrico basi 5-gibboso extus puberulo intus pubescente limbi disco ampliato tubum aequante lobis 5 circ. 1.3 cm. longis 1 cm. latis oblongis subacutis. Stamina 10 subaequalia corolla longiora circ. 3 cm. longa filamentis supra basim dense villosis. Ovarium parvum circ. 3.5 mm. longum viride dense lepidotum; stylus circ. 3 cm. longus basi pilosus stamina subaequans. Capsula nigra recta albido-lepidota circ. 1.4 cm. longa 4 mm. lata (matura?) basi calyce adpresso inclusa.

Species *Rh. hippophaeoidi*, Balf. f. et W. W. Sm. forsan affinis sed major et ramulorum squamulis biformibus, laminae margine petioloque pilis longis obsitis, calycis lobis majoribus circumcirca ciliatis, corolla extus lepidota intus villosiore, staminibus longis villosioribus, stylo basi piloso diversa.

Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Alt. 11,000 ft. Shrub of 4-12 ft. Open thicket. G. Forrest. No. 10,423. July 1913.

A species perhaps allied to *Rh. hippophaeoides*, Balf. f. et

W. W. Sm. but altogether a larger plant with larger leaves. It differs in the indumentum of the twigs, which has biform scales, in the long hairs on the leaf margin—early caducous—and on the petiole, in the larger calyx with membranous lobes and fringed all round with long hairs, in the larger corolla more villous inside and lepidote outside, in the very long stamens with most villous filaments, in the style pilose at base.

There may be some modification needed in the flower description, as all the flowers on the specimen are shrivelled.

**Rhododendron scintillans**, Balf. f. et W. W. Sm.

Suffrutex ad 1 m. altus copiose ramosus ramulis intricatis et virgatis. Ramuli hornotini circ. 1.5 mm. diam. squamis peltatis dense fusco-lepidoti annotini fere esquamosi seniores grisei decorticantes. Alabastrorum parvulorum oblongorum perulae paucae fusco-lepidotae. Folia petiolata ad 1.8 cm. longa; lamina crasse coriacea ad 1.5 cm. longa ad 5 mm. lata lanceolata vel anguste oblonga extremitates versus angustata apice obtusa vel subacuta mucronata margine leviter revoluta basi in petiolum brevem fusco-lepidotum vix 3 mm. longum attenuata supra atro-viridis squamis umbonatis persistentibus uniformibus instita albida cinctis superficialibus discontiguis umbone plerumque secretionem resinosa impleto flavescente scintillante subtus pallide rufescenti-cinnamomea et virescens squamis peltatis discontiguis uniformibus persistentibus rufescentibus nitentibus impressis induta intervallis esquamosis pallide viridibus opacis papillis epidermicis ceriferis obtectis. Flores in umbellas 2-floras terminales dispositi; alabastra florum globosa; bractae steriles rotundatae cucullatae dorso lepidotae margine fimbriato-ciliatae; pedicelli vix 1 mm. longi dense lepidoti. Calyx circ. 3.5 mm. longus vel longior tubo corollae vix brevior fere ad basim 5-lobatus lobis oblongis vel ovatis subacutis purpureis elepidotis margine longe ciliatis. Corollae purpureae extus elepidotae tubus circ. 2 mm. longus intus ad faucem villosus, limbi discus circ. 1.2 mm. latus, lobi ad 8 mm. longi oblongi vel rotundati obtusi crenati. Stamina 10 corollam aequantia filamentis basi latioribus supra ovarium villosis. Ovarium purpureum lepidotum; stylus glaber purpureus staminibus longior; stigma lobulatum.

Species fastigiata *Rh. fastigiato*, Franch. affinis, foliorum pagina inferiore haud glauca, inflorescentia 2-3-flora, corolla extus elepidota separata.

Yunnan. Summit of the Langkong-Hoching Pass. Lat. 26° 20' N. Alt. 11,000 ft. Shrub of 2-3 ft. Flowers lavender purplish blue. Open marshy pasture. G. Forrest. Nos. 10,014, 10,015. May 1913.

Yunnan. Lichiang Range. Lat.  $27^{\circ} 30'$  N. Alt. 11,000–14,000 ft. Dwarf cushion shrub of 1–2 ft. Flowers purple blue. Open pastures and on cliffs. G. Forrest. No. 10,035. May–June 1913.

This plant has a strong likeness to *Rh. fastigiatum*, Franch. It is one of the longer-leaved species amongst the Lapponicum Rhododendrons, and the leaves taper to both ends. Amongst the purple-flowered species with discontinuous scales on the under side of the leaf its nearest ally seems to be *Rh. impeditum*, Balf. f. et W. W. Sm., but that plant has elliptic leaves with the upper surface coated with grey membranous not amber-coloured shining scales. From *Rh. fastigiatum* its 2-3-flowered inflorescence and the lepidote corolla separate it. *Rh. fastigiatum* has a lepidote corolla.

See also p. 300.

### **Rhododendron sino-Falconeri**, Balf. f.

Arbor parva ad 7 m. alta grandifolia. Rami hornotini crassi circ. 1.5 cm. diam. primo pallide fulvo-tomentosi mox griseo-nitentes deinde glabrescentes. Folia longe petiolata ad 3 dm. longa; lamina crasse coriacea oblongo-elliptica vel elliptica ad 27 cm. longa 16 cm. lata apice obtusa vel rotundata rigide mucronata margine plana tenuiter cartilaginea basi obtusa vel late subcuneata supra viridis maturitate glabra plus minusve rugulosa costa media et venis primariis adscendentibus utrinsecus circ. 13–15 sulcatis subtus spadicea costa media venisque primariis elevatis ubique squamis infundibuliformibus (ex stipite plus minusve longo pluricellulari cupulaque apicali membranacea cellularum isodiametricarum vacuarum vesiculosarum margine in fila lanata articulata plurima intertexta extruso aedificatis) indumentum coactum formantibus vestita; petiolus crassus ad 4 cm. longus glabrescens. Flores umbellati; bracteae steriles rotundatae apiculatae extus glanduloso-viscidae, fertiles oblongo-spathulatae circ. 3.5 cm. longae sericeae; pedicelli subaequales ad 4 cm. longi validi eglandulosi pallide tomentosi squamis quam eae foliorum minus cupulatis sub calyce oblique ampliati. Calycis cupula dense tomentosa lobis inaequalibus plerumque minutis triangularibus vel ovatis vel rotundatis vix 1 mm. longis glabris nunc linearibus longioribus tomentosis vel ciliatis. Corolla pallide flava late campanulata ad 5.5 cm. longa obliqua tubo circ. 4 cm. longo extus intusque glabro basi emaculato, lobis 8 rotundatis emarginatis circ. 2 cm. latis. Stamina 16 inclusa filamentis basi latioribus ibique ciliato-puberulis. Ovarium pilis rufis dense fasciatim tomentosum; stylus corollam subaequans glaber apice dilatatus; stigma magnum discoideum lobulatum.



Species aspectu *Rh. Falconeri*, Hook. f. sed foliis supra multo minus rugulosis pedicellis ovarioque eglandulosis divergens.

Yunnan. Mengtz. N. Mountains. Summit of forests. 9000 ft. Tree 20 ft. Flowers pale yellow. Henry. No. 9448.

Hemsley in the Kew Bulletin (1910), 107 refers this plant to *Rh. Falconeri*, Hook. f. against the opinion of Wilson. Wilson was right. The plant is strikingly different from *Rh. Falconeri*. Hooker (Rhod. Sikkim Himal. (1849), 11) precisely describes the pedicels and ovaries of *Rh. Falconeri* as viscid. The viscosity is produced by the conspicuous clavate reddish glands which cover the organs amidst the fewer hairs. The ovaries are so viscid that they glue together the surfaces of the corolla in dried specimens. There is not a trace of these viscid glands in *Rh. sino-Falconeri*, Balf. f., and the character is an easily observed diagnostic mark.

A specimen collected by Hancock under No. 439 on the Great Black Mountain Range at 9000 ft. is also assigned to *Rh. Falconeri*. I have not seen the specimen, but on general grounds of distribution I doubt the identification. So far I know of the occurrence of no one of these large-leaved Himalayan species in Western China. Chinese plants referred to *Rh. grande*, Wight are not that species.

Apart from this differentiating character of the presence or absence of glands there are many others by which the species can be distinguished at a glance. I will not lay stress upon the form of the base of the leaf which in *Rh. sino-Falconeri* is never cordulate whilst that is its shape usually in *Rh. Falconeri*, but the differences in the upper and under surfaces of the leaf in the two plants are thoroughly distinctive. *Rh. Falconeri* is a familiar plant in cultivation, and to most observers, I think, the rugosity of its leaves both above and below, and the dark cinnamon indumentum filling up the excavations on the under side appear as ready marks of recognition. You do not find these features so prominent in *Rh. sino-Falconeri*. There may be a slight rugosity on the upper surface, but the under surface is smooth and velvety with a buff-coloured indumentum. There are no excavations, and the primary veins do not stand out like cords as they do in *Rh. Falconeri*. And along with this we find the under-leaf indumentum in the two species whilst cast in the same general mould is differentiating. In neither species are there epidermal papillae. The epidermis is quite smooth and the leaf-surface is level throughout—there are no pits. The hairs of the tomentum in *Rh. Falconeri* have stout pluricellular stalks which expand at the top as a funnel-shaped membrane one layer thick of many quadrate or rounded thick-walled cells. At the bottom of the funnel

capping, as it were, the stalk is a small convex umbo with reddish or yellowish contents. The margin of the funnel grows out into much-branched fringe segments, which are reddish or brown and interlace with the branches of adjacent funnels. Thus is brought about the more or less woolly tomentum upon which may be seen easily the mouths of the several funnels. In older leaves these may fall away more or less, leaving a paler surface formed by the pedicels and torn fragments of the funnel. In *Rh. sino-Falconeri* the funnel-hairs are likewise formed and make up the indumentum, but the stalks are thinner and longer, the funnel cells are thinner walled, and the marginal fringe segments are longer, their ultimate branches more delicate and paler coloured. Hence in *Rh. sino-Falconeri* we have a softer tomentum and more velvety surface on which the long interlacing hairs spread out. So far as our specimens show, the indumentum here is more persistent. The tomentose coating of the sulcate ovary is composed here of bundles of hairs rising each from a common pluricellular stalk and very closely packed together. The individual branch hairs are long and thread-like. In *Rh. Falconeri* there is nothing of this. Merely secreting glands.

Other marks separating the two species there are, such as:—the flower pedicels in *Rh. sino-Falconeri* are stouter, the flowers are larger. Altogether the plants are thoroughly distinct.

By the name *Rh. sino-Falconeri* is indicated that this species is the Chinese representative of the Himalayan *Rh. Falconeri*. It is—in the present state of knowledge—the most southerly of all the large-leaved species in China.

#### **Rhododendron sino-grande, Balf. f. et W. W. Sm.**

Frutex grandifolius ad 7 m. altus. Rami juveniles crassi circ. 1 cm. diam. indumento foliorum argenteo-grisei. Alabastro-rum ovatorum perulae externae rotundatae acuminato-caudatae rubro-purpureae extus glandulis rubris verruculosae intermediae carinatae. Folia longe petiolata magna ad 4.5 dm. longa; lamina crasse coriacea oblonga vel oblongo-elliptica vel rarius obovata ad 4 dm. longa ad 19 cm. lata apice rotundata rigide mucronata margine cartilaginea fere plana basi obtusa vix cordulata supra vix plana vel vix areolata opaca viridis glabra costa media lata anguste sulcata venis primariis utrinsecus circa 16 sulcatis subtus argentea nitens costa media venisque primariis secundariisque ex parte elevatis maturitate brunneis primum indumento obtectis sed plus minusve glabrescentibus caeteroquin laevis strato compacto tenuissimo crustiformi uniformi persistente (indumenti pilis breviter stipitatis stipite pluricellulari colorato ad apicem copiose ramoso ramulis unicellu-

laribus latis vacuis vesiculosus quoquoersus intertextis) vestita ; petiolus crassus indumento argenteo plus minusve obtectus glabrescens ad 5 cm. longus. Flores plures umbellatim vel racemoso-umbellatim dispositi rhachi circ. 3 cm. longa eglandulosa tomentosa ; alabastra inflorescentiae globosa ; bractae steriles ovatae vel orbiculares acuminato-caudatae glabrae, fertiles latae spathulato-elongatae apice rotundatae vel truncatae erosae mucronatae extus intusque sericeae circ. 5 cm. longae 3 cm. latae ; pedicelli crassi ad 3 mm. lati inaequales ad 4 cm. longi sub fructu 6 cm. densissime lanato-tomentosi rubido-grisei indumenti pilis similibus eis foliorum sed stipite brevior et ramulis angustioribus longioribus divaricatim intertextis eglandulosi. Calyx obliquus lanato-tomentosus dentibus minutis pilis obscuratis nonnunquam glabrescentibus. Corolla carnosula alba circ. 5 cm. longa a basi late campanulata obliqua tubo circ. 3.5 cm. longo extus intusque glabro gibboso et basi intus postice varo magno atro-rubro notato, lobis 10 circ. 2 cm. latis emarginatis. Stamina 18 corolla multo breviora filamentis basi latioribus ciliato-puberulis. Ovarium crassum eglandulosum dense lanato-tomentosum pilis rufis fasciatim dispositis ; stylus tubum corollinum paullo superans circ. 2.5 cm. longus glaber validus sub stigmate expansus ; stigma magnum discoideum lobulatum. Capsula tomento plus minusve deterili tomentosa curvata circ. 3 cm. longa 1 cm. lata. Semina oblonga complanata ala angusta arillata longitudinaliter striata circ. 4 mm. longa pallide spadicea.

Species superba *Rh. grandis*, Wall. foliorum indumento floribusque similis sed foliis latioribus, pedicellis dense lanato-tomentosis, ovario eglanduloso, stylo valido brevi bene distincta.

Yunnan. Western flank of the Shweli-Salween Divide. Lat. 25° 20' N. Alt. 11,000 ft. Shrub of 20-35 ft. In fruit. (Flowers crimson or rose?) In rhododendron forests. G. Forrest. No. 9021. Aug. 1912.

Yunnan. G. Forrest. No. 9369. Dec. 1912.

Yunnan. Shweli-Salween Divide. Lat. 25° 30' N. Alt. 10,000-11,000 ft. Shrub of 25 ft. Flowers fleshy dull white, with a blotch of deep crimson at base. In rhododendron forests. G. Forrest. No. 11,875. April 1913.

An even finer plant than *Rh. grande*, Wight.

The indumentum in *Rh. sino-grande* and in *Rh. grande* is quite diagnostic. As in other large-leaved species with a hair covering on the under side of the leaf there are no epidermal papillae, and the evenness of the leaf-surface is also not interrupted by pits. Rising from the epidermal cells in numbers are pluricellular hairs which form first of all a stalk of longish

cells—the stalk shorter in *Rh. grande* than in *Rh. sino-grande*—from the top of which branch off many broad thin-walled cells of varying length, and it is these cells which become interwoven and pressed together to form the smooth surface of the under side of the leaf. The stalk cells retain a yellowish content, the branch cells are empty and uncoloured, hence the shining silvery look of the leaf under surface. *Rh. grande* is one of the Himalayan Rhododendrons easily diagnosed by its leaves amongst the large-leaved species. The leaves are always widest at the middle. They seem not to become obovate. The like feature belongs to *Rh. sino-grande*—which has usually broader leaves—except in the case of very large leaves.

*Rh. sino-grande* is apparently the Chinese representative in South-Western Yunnan of the Himalayan species. But the two species are readily separated by the total absence of glands from the pedicels and ovary of *Rh. sino-grande* and their presence in *Rh. grande*. The glands in *Rh. grande* are typical clavate glands, reddish or yellowish on longer or shorter stalks, and their excretion is extremely sticky. The thin long style of *Rh. grande* projecting the globose stigma from the corolla mouth is a familiar feature of the species. In *Rh. sino-grande* the style is stout, thin, and hardly longer than the corolla tube.

I understand Mr. Forrest has obtained seed of this splendid species. Though its home is in the South-West of Yunnan, the elevation—10,000–11,000 ft.—at which it grows may give us hope that in Britain it may prove to be one of the hardy large-leaved species.

The dried flower bears out Mr. Forrest's description of it attached to his No. 11,875—white, with basal crimson blotch. That he says of the flower of No. 9021 "crimson or rose?" does not invalidate this, for the specimens are in fruit and no fresh flowers were seen by him.

In the Flora of British India (1882) Mr. Clarke treated *Rh. argenteum*, Hook. f. (1849) as a synonym of *Rh. grande*, Wight (1847), and he gave similar treatment to *Rh. longifolium*, Nutt. (1853). Since that date the name *Rh. grande* has come into general use for all the forms which previously passed under Hooker's and Nuttall's names. It is in this sense I speak here and without prejudice of *Rh. grande*, Wight. The suppression of names did not pass without protest. Mr. J. H. Mangles, keenest of observers and unrivalled of growers of Rhododendrons, writing in 1884<sup>1</sup> of "*Rhododendron argenteum* and *Rh. longifolium*," says: "The Sikkim *argenteum* and its Bhotan ally (yet very distinct) *Rh. longifolium* are now in

<sup>1</sup> The Garden, xxv (1884), 177.

bloom. . . . The latest authority doubles *Rh. argenteum* up with *Rh. grande* which, with all humility, I am prepared to show is quite distinct." Elsewhere in the current literature of the day Mr. Mangles gave expression to his view—and here may I ask is there no enthusiast who will bring together and publish the writings upon Rhododendrons by Mr. Mangles which are scattered through horticultural periodicals? A valuable work it would be—that geographical variation in these Himalayan types to the extent of specific difference is a feature of the genus. In one striking passage he says<sup>1</sup>: "As the Himalayan range passes eastward through Nepal, Sikkim, and Bhutan, the genus *Rhododendron* becomes truly protean in form and presents not only an extraordinary number of species in a small space but also striking geographical varieties in very great abundance." To him *Rh. argenteum*, Hook. f. is the Nepal and Sikkim form which finds its representative through Bhutan in *Rh. grande*, Wight and also in *Rh. longifolium*, Nutt. in the same way as in *Rh. Falconeri*, Hook. f. and in *Rh. Thomsoni*, Hook. f. there are to be observed western and eastern forms. The basal soundness of the opinion is borne out by later discoveries of representative forms of the earlier known Himalayan species so far to the eastwards as Yunnan.

Upon the question of the degree of difference between *Rh. grande*, Wight, *Rh. argenteum*, Hook. f., and *Rh. longifolium*, Nutt. nothing of moment can be added as yet to the evidence available to those who in the past have extracted from it the two divergent conclusions which have been stated. And this must remain the position until we obtain more material from Bhutan. Amongst the specimens which have already come to Edinburgh, presented by Mr. Bulley from the collecting of Mr. R. E. Cooper in Bhutan, is one of a *Rhododendron* in fruit which belongs without doubt to this series, and we will hope that the spoil of Mr. Cooper's further exploration will include additional specimens bearing upon the problem. As Mr. Cooper is primarily collecting seeds the dried specimens he sends are mostly of fruiting plants, and therefore some years must elapse before the plants raised from his seeds will supply satisfactory proof of their identity. I myself am inclined to the view expressed by Mr. Mangles, and expect that when we do get to know the Rhododendrons of Bhutan we shall find that the type which in Sikkim is *Rh. argenteum*, Hook. f., in Bhutan shows differences in more than one direction, which justify separate nomenclature of microforms or species under the names *Rh. grande*, Wight, *Rh. longifolium*, Nutt., and probably others.

Meanwhile to come to something more precise, I have to

<sup>1</sup> Gardeners' Chronicle, n.s., xvii (1882), 295.



record here evidence of the spread of the type of *Rh. grande* to areas far outside Bhutan. In these pages are described two distinct species:—one from the Shweli-Salween Divide in Yunnan on the Burmese-Chinese frontier—*Rh. sino-grande*, Balf. f. et W. W. Sm.; one from the Mekong-Yangtze Divide in Northern Yunnan—*Rh. praestans*, Balf. f. et W. W. Sm.

**Rhododendron sphaeranthum**, Balf. f. et W. W. Sm.

Frutex aromaticus lediformis virgatus ad 12 dm. altus laxè ramosus. Ramuli hornotini circ. 1 mm. lati fulvi squamis longestipitatis porriginosis seniores nigricantes et stipitibus albidis squamarum decapitatarum setulosi tandem decorticantes. Alabastrorum oblongorum acutiusculorum perulae mox deciduae externae spadiceae coriaceae anguste elongato-triangulares circ. 3 mm. longae 1 mm. latae extus lepidotae margine ciliatae intus puberulae interiores anguste subspathulatae obtusae circ. 6 mm. longae 1 mm. latae membranaceae extus lepidotae margine ciliatae. Folia petiolata ad 2.5 cm. longa crasse coriacea; lamina anguste oblonga ad 2.2 cm. longa ad 8 mm. lata apice obtusa vel subrotundata corneo-mucronulata margine integra revoluta pedibus squamarum delapsarum exasperata basi obtusa vel subcuneatim angustata supra atro-viridis (costa media subsulcata venarum reti caeteroquin inconspicuo) squamarum juvenilium vestigiis conspersis notata subtus porriginosa plus minusve fulva squamis contiguis persistentibus stipitatis ex umbone convexo institaque fimbriata aedificatis paucis majoribus longiusque stipitatis umbone fusciscentis stratum superius facientibus caeteris breviter stipitatis pallide flavido-viridibus in stratum inferius densum dispositis; petiolus vix 3 mm. longus lepidotus. Flores rosei vel albi ad extremitates ramulorum strictorum laxè foliatorum in umbellas capituliformes multifloras rhachi lepidota congesti; bractae steriles late ovatae coriaceae circ. 6 mm. longae extus lepidotae margine ciliatae intus puberulae fertiles rametaceae circ. 7 mm. longae 3 mm. latae subobovatae vel spathulatae ciliatae extus furfuraceo-lepidotae; prophylla spathulata 5 mm. longa 0.5 mm. lata calyce multo longiora lepidota et lanata; pedicelli brevissimi circ. 1 mm. longi lepidoti. Calyx parvus crateriformis vix 1 mm. longus ad medium fissus lobis rotundatis ciliatis extus interdum squamis paucis lepidotis intus glabris. Corollae 1.6 cm. longae tubus cylindricus paullo curvatus circ. 1 cm. longus extus puberulus intus villosulus, limbi plani discus circ. 1.5 mm. latus, lobi rotundati circ. 4.5 mm. diam. imbricati integri subtus interdum sparsissime lepidoti. Stamina 5 circ. 6 mm. longa filamentis supra basim minute puberulis antheris oblongis 1 mm. longis. Ovarium ovoideum circ. 2 mm. longum 5-lobatum squamis contiguis parvis lepi-

dôtum; stylus parvulus 0.5 cm. longus clavatus ovario multo brevior stigmatibus 5-lobato coronatus.

Species lediformis ex affinitate *Rh. cephalanthi*, Franch. perulis deciduis, floribus plus minusve roseis, prophyllis calyce multo longioribus, inflorescentiae rhachi et pedicello lepidoto, corolla carnosula extus lepidota, staminum filamentis puberulis, stylo quam ovarium multo brevior notata.

Yunnan. Mountains of the Fengkow Valley. Alt. 12,000–13,000 ft. Lat. 27° 40' N. Shrub of 18 ins. to 4 ft. Foliage aromatic. Flowers from deep clear rose to pure white. In open pine forests. G. Forrest. No. 12,505. June 1914.

*Rh. sphaeranthum*, Balf. f. et W. W. Sm. is a small virgate bush with leaves and flower trusses recalling *Ledum*. *Rh. ledoides*, Balf. f. et W. W. Sm. and *Rh. radinum*, Balf. f. et W. W. Sm. are its nearest allies in the *Cephalanthum* series, to which it belongs. Like them both in its leaves, it differs from *Rh. radinum* in having the scale-leaves of the foliage buds deciduous, a character in which it resembles *Rh. ledoides*. Differentiating characters are the lepidote not puberulous rhachis of the inflorescence, its long prophylls much longer than the calyx, and its lepidote corolla.

The species is in cultivation and has flowered in Britain.

See also p. 316.

### ***Rhododendron tapetiforme*, Balf. f. et Ward.**

Fruticulus prostratus late atque patens ramosissimus. Ramuli annui circ. 1 cm. longi, annotini circ. 1 mm. diam. squamis peltatis ferrugineis confertis porriginosi seniores nigricantes reliquiis squamularum et pulvinis foliorum delapsorum verruculosi mox desquamantes. Alabastrorum parvorum ovoideorum perulae paucae externae crassae ovatae extus lepidotae internae oblongae obtusae crustaceae apice margineque minute albo-ciliatae dorsoque lepidotae. Folia coriacea parva breviter petiolata ad 1.2 cm. longa; lamina a petiolo recurvata oblonga vel elliptica circ. 1 cm. longa 6 mm. lata apice obtusa vix mucronulata sed verrucula hydathodali terminata margine leviter recurva basi obtusa vel late subcuneata supra atro-viridis opaca squamis peltatis albidis translucetibus contiguis persistentibus superficiem quasi punctatam exhibentibus lepidota subtus spadicea nitida squamis peltatis contiguis uniformibus ex umbone intensius colorato institaque pallidiore aedificatis induta costa media venisque primariis supra paullo impressis subtus costa media vix elevata venis occultis percursa; petiolus circ. 2 mm. longus dense spadiceo-lepidotus. Flores brevissime pedicellati in umbellam terminalem 3-floram congesti; bractae steriles ovatae vel subrotundatae coriaceae fere lignosae

fertiles tenuiores extus pubescentes elepidotae intus subsericeae; pedicelli circ. 2 mm. longi pubescentes et albido-lepidoti sub calyce expansi. Calycis parvuli cupula circ. 0.5 mm. longa dense albido-lepidota lobis 5 aequalibus minutis vix 0.5 mm. longis et latis sublunatis vel late deltoideis rubris elepidotis margine pilis brevibus ex toto ciliatis. Corollae circ. 1.2 cm. longae roseae extus elepidotae tubus brevis circ. 3.5 mm. longus infundibuliformis basi subgibbosus ad faucem intus minute puberulus in limbum apertum 5-lobatum expansus lobis oblongis circ. 8 mm. longis. Stamina 10 subaequalia corolla paullo longiora filamentis pallide roseis supra basim ad faucem corollae lanato-villosis. Ovarium albido-lepidotum; stylus glaber roseus stamina subaequans; stigma discoideum lobulatum atro-rubens. Capsula 4.5 mm. longa valvis 5 ad basim dehiscens.

Species fastigiata indumenti subfoliaris squamis contiguus et floribus roseis distincta.

Tibeto-Yunnan frontier. Ka-gwr-pw. 15,000 ft. Dwarf, forming a carpet. Flowers pink. F. Kingdon Ward. No. 795. July 1913.

This species belongs to the Lapponicum series, and is one of the forms marked by the contiguous uniform brown scales on the under-leaf surface. It has an elepidote corolla, and the glabrous style about equal in length to the stamens. In indumentum it is like *Rh. rupicolum*, W. W. Sm., but that plant is altogether larger and has a lepidote corolla.

See also p. 300.

### **Rhododendron telmateium, Balf. f. et W. W. Sm.**

Suffruticosum humile parvifolium intricato-ramosissimum ad 1 m. altum. Ramuli annui breves circ. 1 cm. longi vel subvirgati circ. 4 cm. longi hornotini tenues vix 1 mm. diam. ferruginei squamis peltatis furfuracei seniores sordide grisei verruculis nigris plus minusve induti mox decorticantes. Alabastra fusiformia circ. 3.5 mm. longa spadicea perulis paucis exterioribus late ovatis extus lepidotis interioribus oblongis obtusis mucronulatis pilis ciliatis. Folia petiolata circ. 1 cm. longa; lamina anguste lanceolata vel oblonga circ. 8.5 mm. longa 3 mm. lata ad apicem angustata ibique conspicue corneo-mucronulata margine vix revoluta basi in petiolum angustata supra canescenti-viridis squamis peltatis albidis contiguis conspicuis uniformibus persistentibus adpressis ex umbone marginatim flavido-nitido institaque lata constructis lepidota subtus alutacea brunneo-punctata squamis (ut supra aedificatis sed biformibus plerisque pallidioribus albidis vel ad umbonem subrufescentibus in stratum inferius dispositis paucioribus longius stipitatis umbone institaque intense brunnea ultra

stratum inferius projectis) oblecta costa media supra subsulcata subtus paullo elevata venis primariis utrinque occultis; petiolus circ. 1.5 mm. longus indumento sicut folii pagina inferior vestitus. Flores solitarii ad apicem ramulorum terminales; alabastra ovoidea; bracteae externae ovatae interiores late rotundatae extus lepidotae margine leviter ciliatae; pedicelli breves circ. 2.5 mm. longi albedo-lepidoti. Calyx circ. 2.5 mm. longus fere ad basim in lobos 5 subaequales oblongos obtusos pallide virides nunc erubescences extus dense lepidotos margine eciliatos fissus. Corollae roseo-purpureae circ. 1.3 cm. longae tubus infundibuliformis brevis circ. 3.5 mm. longus extus lepidotus intus puberulus haud villosus sursum in limbum apertum expansus disco circ. 1.5 mm. lato lobisque oblongis obtusis 5 circ. 8 mm. longis undulatis. Stamina 5–10 corolla breviora filamentis pallide roseis supra basim paullo pubescentibus. Ovarium subcylindricum pallide viride albedo-lepidotum; stylus glaber roseus corollam staminaque superans; stigma purpureum lobulatum.

Species fastigiata *Rh. diacrito*, Balf. f. et Ward affinis, foliis lanceolatis apice angustatis mucronulatis differt.

Yunnan. Mountains west of Fengkow Valley. Lat. 27° 40' N. Alt. 10,000–11,000 ft. Open rocky situations in pine forest. Shrub of 2 ft. Flowers rose-purple. Forrest. No. 12,478. June 1914.

Yunnan. Mountains of the Chungtien plateau. Lat. 27° 30' N. Alt. 12,000 ft. Open boggy situations on the margins of forests. Shrub of 3 ft. Flowers indigo-purple. Forrest. No. 12,568. June 1914.

One of the *Lapponicum* series of *Rhododendrons*. The two sets of specimens collected by Forrest and referred to this species differ markedly in the colour of the corolla, and in No. 12,568 the calyx shows a tendency to reddening, sometimes becoming quite purple—a feature not observable in No. 12,478. But I find no other separating character. The species is near *Rh. diacritum*, Balf. f. et Ward, but the leaf form is here quite diagnostic. It must also be compared with *Rh. drumonium*, Balf. f. et Ward, and with *Rh. pycnocladum*, Balf. f. et W. W. Sm. All of them are of the *Lapponicum* series, and of the set in it which are marked by the punctulate character of the under-leaf indumentum and also by the lepidote corolla. *Rh. pycnocladum* has quite a different habit from the other three, which are erect shrublets with very many thin twigs bearing small leaves yellowish-grey beneath. The narrow leaves of *Rh. diacritum* separate it from our species. *Rh. drumonium* has a short style.

See also p. 300.

**Rhododendron theiochroum**, Balf. f. et W. W. Sm.

Fruticulus esetosus ad 12 dm. altus foliis (4-5) annotinis ad apices ramulorum subverticillatim aggregatis. Ramuli annotini ad 2.5 mm. diam. lutei vel erubescens squamis peltatis immersis lepidoti epilos in anno tertio vel quaterno cinerei et decorticantes. Alabastrorum ovoideorum circ. 3 mm. longorum perulae crustaceo-coriaceae late ovatae vel rotundatae obtusae atropurpureae vel rubescentes dorso lepidotae margine albido-ciliatae. Folia epilosa esetulosa ad 5 cm. longa breviter petiolata; lamina obovata ad 4.5 cm. longa ad 3 cm. lata crasse coriacea apice rotundata vel subtruncata mucrone corneo deflexo praedita coriacea margine obscure crenulato-undulata basi late cuneatim in petiolum crassum circ. 5 mm. longum subalatum foveolatum foveolis squamarum peltatarum vestigiis impletis attenuata, supra laete viridis nitida glaberrima rugulosa costa media sulcata venis primariis utrinsecus circ. 7 vix apparentibus subtus erubescens et glauca papillis epidemicis conoideis elongatis uniformiter praedita et squamis peltatis discontinuis biformibus—magnis parvisque—persistentibus in foveolas profundas immersis haud exsertis punctulatis copiose lepidota squamula quaque ex umbone concavo plus minusve rubro-resinoso instita semi-erecta angusta stipite longo crasso aedificata, costa media elevata straminea paullo lepidota venarum reti caeteroquin occulto. Flores sulfureo-lutei ad 5 in umbellam veram terminalem dispositi; bracteae mox deciduae; prophylla circ. 8 mm. longa filiformia claviformia plus minusve sericea; pedicelli circ. 8 mm. longi sub fructu longiores validi squamulis haud immersis lepidoti. Calyx ad 6 mm. longus ultra medium fissus cupula crateriformi foveolatim lepidota lobis ellipticis subinaequalibus circ. 4.5 mm. longis 3 mm. latis membranaceis erubescens extus margineque lepidotis intus nitidis. Corollae subobliquae sulfureo-luteae emaculatae circ. 1.7 cm. longae tubus latus subinfundibuliformis circ. 7 mm. longus intus glaber extus praecipue postice plus minusve lepidotus quinquelobatus lobis rotundatis imbricatis circ. 1 cm. diam. vel majoribus explanatis margine crenulatis. Stamina 10 antipetalina 5 paullo breviora circ. 1.4 cm. longa filamentis validis basi glabris supra basim intra tubum corollinum floccosim villosis, antheris magnis circ. 4 mm. longis laete brunneis. Ovarium conoideum sulcatum basi latum circ. 3 mm. longum squamis peltatis rubro-resinosis dense lepidotum; stylus validus ab apice ovarii abrupte deflexus staminibus brevior ad 6 mm. longus ad basim convexam sparse lepidotus superne expansus et stigmate lobulato coronatus. Capsula cylindrica ad 8 mm. longa 4 mm. lata nigricans squamarum vestigiis asperata.

Species *Rh. sulfureo*, Franch. affinis sed esetulosa et foliis



conspicue obovatis subtus erubescens, calycis lobis ellipticis haud setulosis, corolla majore praecipue distinguenda.

Yunnan. Shweli-Salween Divide. Alt. 10,000–11,000 ft. Lat. 25° 30' N. Shrub of 2–4 ft. Flowers fleshy bright sulphur-yellow. Open situations amongst dwarf scrub. G. Forrest. No. 11,910. April 1913.

This plant is the representative in the Shweli-Salween Divide of the Tali species *Rh. sulfureum*, Franch. It differs from *Rh. sulfureum* in its much thicker and obovate leaves, in its larger flowers, and in the want of setae upon the calyx and elsewhere. This setulose character of *Rh. sulfureum* requires study. The setae are few in number in some plants—Delavay's No. 2212 and Forrest's 4135A are not profusely setulose. The setae are in these species to be found only upon the calyx. But in Forrest's No. 12,434 the setae are profuse beyond the calyx, spreading over the petioles and the stems also. Specimens in which the shoots are thus somewhat strigillose suggest specific difference, but there is amongst Mr. Forrest's gatherings from the same locality and at the same date a gradation of forms from the extreme of abundance to the extreme of poverty in the matter of setae, and one must look upon the character as a varying one in the species. I find no setae on *Rh. theiocrum*. Mr. Forrest has another series of specimens from the Tali Range under numbers 4135B and 6777 which are esetulose. In this they resemble *Rh. theiocrum* as they do in the punctulate lepidoteness of their leaf under-surface. Their leaf form is, however, not obovate, and resembles more that of true *Rh. sulfureum* from which, in addition to the absence of setae, they are separated by this punctulate lepidoteness which is very different from the closer set indumentum of true *Rh. sulfureum*. Taking more minute characters *Rh. theiocrum* is readily diagnosed by its conoid long epidermal papillae from *Rh. sulfureum* where they are low domes; and in this character Forrest's Nos. 4135B and 6777 are quite different from *Rh. theiocrum*, and approach, though they are not identical with, *Rh. sulfureum*. I have not named Forrest's 4135B and 6777 as a distinct species, although I think it is one. What I have said about it may suffice to direct attention to it as a microform of *Rh. sulfureum* to be looked for.

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I add here some notes made during the sifting of the material which has given the species described in the preceding pages. They are fragmentary, but I publish them because it is unlikely that I shall deal with these Rhododendrons again,

and the notes may be of use constructively or destructively to some future monographer of the genus. They are perhaps better placed together in this way than incorporated with the specific descriptions. They refer entirely to species which would fall into the Section Osmothamnus.

#### MAXIMOWICZ'S SECTION OSMOTHAMNUS.

When in 1870\* Maximowicz instituted the Section Osmothamnus of the genus Rhododendron—taking for it the name of the genus framed by De Candolle for two North Asian aromatic shrublets described first of all as *Azalea fragrans*, Adams and *Azalea pallida*, Turcz.—he could bring only one North Chinese species into his Section, namely, *Rh. micranthum*, Turcz. In the years that have passed since Maximowicz wrote upon the East Asiatic Rhododendrons, China has supplied us with more Rhododendrons than were then known from the whole world. A multitude of these forms would claim entry into Maximowicz's Section Osmothamnus, but the new species bring for examination and critical analysis material which shows that in the Section Osmothamnus as framed by Maximowicz more than one natural phylum is included. The groupings of the species within the genus Rhododendron introduced by Maximowicz were a great advance in the direction of natural arrangement over those which were dominant before his essay, and now advance in knowledge seems to require some modification of Maximowicz's sections if by such division of the genus we are to give expression to phyletic relationships.

Maximowicz included eleven species in his Section Osmothamnus:—

- Rh. anthopogon*, D. Don.
- Rh. ferrugineum*, Linn.
- Rh. fragrans*, Maxim.
- Rh. hirsutum*, Linn.
- Rh. lapponicum*, Wahlenb.
- Rh. lepidotum*, Wall. c. vars. Hookerianis [that is including *Rh. elaeagnoides*, Hook. f., *Rh. obovatum*, Hook. f., *Rh. salignum*, Hook. f.].
- Rh. micranthum*, Turcz.
- Rh. nivale*, Hook. f.
- Rh. parvifolium*, Adams.
- Rh. pumilum*, Hook. f.
- Rh. setosum*, D. Don.

\* Rhododendreae Asiae Orientalis in Mém. de l'Acad. Imp. d. Sc., Petrogr., xvi, No. 9 (1870).

My study of the genus suggests that these species fall into the following natural series :—

- A. *Rh. anthopogon*, D. Don.
- B. *Rh. ferrugineum*, Linn. ; *Rh. hirsutum*, Linn.
- C. *Rh. fragrans*, Maxim.
- D. *Rh. lapponicum*, Wahlenb. ; *Rh. nivale*, Hook. f. ;  
*Rh. parvifolium*, Adams.
- E. *Rh. elaeagnoides*, Hook. f. ; *Rh. lepidotum*, Wall. ;  
*Rh. obovatum*, Hook. f. ; *Rh. pumilum*, Hook. f. ;  
*Rh. salignum*, Hook. f.
- F. *Rh. micranthum*, Turcz.
- G. *Rh. setosum*,\* D. Don.

Many species have been added to the Section *Osmothamnus* since Maximowicz wrote, and I am not yet in a position to be able to deal with it comprehensively. What I am to say relates to three of the natural series which I seem to see amongst the species named by Maximowicz—that of *Rh. anthopogon*, that of *Rh. fragrans*, and that of *Rh. lapponicum*. Descriptions of new species belonging to all of these are given above, and I have to add another natural series of which no species was known to Maximowicz—that of *Rh. cephalanthum*. I call the series respectively Anthopogon, Fragrans, Lapponicum, Cephalanthum, after the oldest-described species, and in that sense these designations appear in the discussion of specific relationships in the foregoing pages.

#### ANTHOPOGON SERIES.

G. Don instituted the Section Pogonatum, in which his *Rh. anthopogon* was the sole species, and I would have taken that name for the series but that the Section Pogonatum has had species thrust into it which are not of the series of Anthopogon, and I wish to aggregate phyletic forms around a central type.

The several characters of the Anthopogons are :—

Aromatic shrubs with small short-stalked leathery leaves ultimately dark green above and blood red beneath with peltate scales composed of an umbo charged with shining red secretion and of a narrow few-armed fringe. An upper layer of scales on the under side of the leaf forms a smooth surface covering scales in all stages of development. Many scales of the twigs and petioles losing their disks become setae. Bracts of the capitate umbel broad not falling off until flower-opening, always lepidote and fringed. Calyx campanulate unequally lobed, lobes

\* Perhaps the grounds upon which I separated "*setosum*" may not be valid. I have not yet been able to study it adequately.

green more or less membranous. Corolla oblique tube relatively long curved fleshy villous at throat and downwards, lobes repand, yellow, pink or white. Stamens glabrous or puberulous. Ovary and style very short, about same length.

To the series as I know it belong the following species :—

<i>Rh. anthopogon</i> , D. Don.	Nepal, S.W. Sikkim.
<i>Rh. hypenanthum</i> , Balf. f.	N.W. Himalaya.
<i>Rh. haemonium</i> , Balf. f. et Cooper.	Bhutan, perhaps also N. and E. Sikkim. 13,000 ft.
<i>Rh. rufescens</i> , Franch.	Yunnan.

That there are others yet to be recognised I have no doubt.

### KEY TO THE SPECIES.

1. Perulae persistent. Corolla yellow . . . . . *hypenanthum*.  
    Perulae deciduous . . . . . 2.
2. Corolla yellow . . . . . *haemonium*.  
    Corolla rose to white . . . . . 3.
3. Calyx lobes obovate-oblong lepidote. Filaments glabrous.  
    . . . . . *anthopogon*.  
    Calyx lobes narrowly oblong glabrous. Filaments puberulous.  
    . . . . . *rufescens*.

In cultivation are *Rh. anthopogon* and *Rh. hypenanthum*—perhaps also *Rh. haemonium*.

*Rh. anthopogon* was described and named in 1821 by D. Don from Wallich's Gossain Than specimens.\* The description is good as a diagnosis of the species from other forms known at the date of writing, but in the present time of so much more knowledge of Rhododendrons from the Himalayas, Northern

\* D. Don in Mem. Wern. Soc. iii (1821), 409. The paper in which the description is given was read before the Society on 18th Nov. 1820. Don's description runs :—

*Rhododendron anthopogon*, ramulis dense pubigeris; foliis ovalibus subtus dense tomentosis; floribus capitatis; corolla subhypocrateriformi fauci barbato, genitalibus inclusis.

Habitat in Alpe immensa nivosa, Gossaignsthan Nepaliensium dicta. D. Wallich. h.

Frutex  $\Delta$  pedalis fasciculatim ramosissimus, ramis fastigiatis; cortex rugosus, rimosus, deciduus, ramulis pube brevissimo ferrugineo dense instructis; folia ovalia petiolata subretusa coriacea supra nuda anastomosanti venosa, subtus dense ferrugineo-tomentosa. Flores capitati; pedunculi brevissimi resinosi; laciniae calycinae breves rotundatae margine villosae; corolla subhypocrateriformis roseo-purpurea, tubo cylindrico, laciniiis rotundatis crispato-crenulatis, fauce villo tortuoso candido barbato; genitalibus tubo inclusis; filamenta plana glabra; stylus superne crassior staminibus duplo brevior; stigma depressum.

*Rhododendron dauricum*, ab supera primo discriminatur foliis tenuioribus deciduis nudis utrinque punctis resinosis crebre instructis; floribus paucis lateralibus, corollis subrotatis tubo vix ullo fauce nudo; genitalibus longe exsertis; stigmate capitato.

Asia, and Western China, Don's characterisation is little more than a group distinction.

In 1825 D. Don republished in an extended form his description of *Rh. anthopogon*, citing again only Wallich's Gossain Than specimens.\* It is noteworthy that in these two descriptions Don gives the flower colour as "roseo-purpurea" and "rosea," but no mention is made in either of whorls of persistent foliage-bud scale-leaves. Are we to assume the absence of these scales on the Gossain Than plants? When present on plants of this alliance the scale-leaves are conspicuous and cannot be overlooked. One must suppose that Don's authority for the flower colour was Wallich himself.

In 1834 George Don published a description of *Rh. anthopogon*, citing only Gossain Than plants.† A remarkable change is now introduced. The flowers are said to be "sulphur-yellow," and there is no reference to "roseo-purpurea" or "rosea" of the earlier descriptions. Further—G. Don adds to his description "Cl. 1820." Now Wallich was in Nepal from December 1820 until November 1821,‡ and obtained during that period, I presume, his Gossain Than specimens. The plants cultivated in Britain in 1820 could not therefore be

\* D. Don, *Flora Nepalensis* (1825), 153. The revised description runs:—

*Rhododendron anthopogon*, ramulis pubescentibus, foliis ovalibus subtus ferrugineis lepidoto-tomentosis, floribus glomeratis pentandris, corollis hypocrateriformibus fauce lanatis! staminibus inclusis.

*Rhododendrum anthopogon* in Mem. Wern. Soc. iii, p. 409.

Hab. in Gosaingsthan Nepalensium. Wallich. h.

Frutex pedalis v. sesquipedalis, sempervirens, rigidus, fasciculatim ramosissimus. Rami flexuosi, fastigiati, cortice rugoso laminoso deciduo. Ramuli teretes, pube brevissima ferruginea lepidota omnino tecti. Folia ovalia, coriacea, petiolata, supra nuda, opaco-viridia ac reticulato-venosa, subtus dense lepidota, ferruginea, apice mucronulo reflexo. Flores terminales, glomerati, subsessiles. Pedicelli breves, lepidoti et resinosi. Calyces campanulati, 5-partiti, virides; segmenta ovalia, apice rotundata, margine villosa. Corolla hypocrateriformis! rosea: tubus cylindraceus, limbo plurimum longior, superne dilatatus: lobis limbi rotundatis, crispato-crenulatis: faux coarctata, lana copiosa nivea tortuosa tecta! Stamina 5, inclusa! tubo multo breviora. Filamenta gracilia, erecta, glabra. Stylus superne crassior, staminibus plurimum brevior. Stigma clavatum. Capsula 5-locularis, 5-valvis.

† G. Don, *Syst. iii* (1834), 845. The description runs:—

*Rh. anthopogon* (D. Don in Mem. Wern. Soc. iii, p. 409)—branchlets downy, leaves oval, rusty beneath from lepidoted tomentum; corollas with a woolly throat. h F. Native of Nipaul, on Gosaingsthan. R. aromaticum, Wall. cat. Shrub much branched. Leaves ending in a reflexed mucrone, naked above. Flowers glomerate, sulphur-coloured. Pedicels short, lepidoted and resinous. Calycine segments rounded at the apex, with villous margins. Segments of corolla roundish, with undulately curled margins. Filaments glabrous. Stigma clavate.

Bearded-flowered Rhododendron. Fl. April, May. Clt. 1820. Shrub 1 to 1½ foot.

‡ Burkill, Notes from a Journey to Nepal in Rec. Bot. Surv. Ind. iv (1910), 59.



derived from Wallich's Nepal seeds or plants. What, then, was the source of the plant with sulphur-yellow flowers recorded by G. Don as in cultivation in 1820?

Perhaps we get some light on the question from Wallich's Catalogue. In the part of it published in 1829, the name *Rh. anthopogon*, D. Don appears under No. 759, and two stations are given:—1. Gossain Than; 2. Kumaon. Wallich therefore did not differentiate specifically N.W. Himalayan and Nepal specimens. This is the starting-point of a confusion which remains to this day. It seems to be likely that the plants to which G. Don refers as in cultivation in 1820 were derived from N.W. Himalaya. Abundance of plants had been introduced from N.W. Himalaya before this date, and as we now know all the N.W. Himalayan plants which have been named *Rh. anthopogon*, Don have yellow flowers. We also know that there are yellow-flowered plants of the *Anthopogon* phylum in the East Himalaya—Bhutan, N. and E. Sikkim. Were Bhutan and Sikkim plants in cultivation at this early date? G. Don's book of 1834 was intended to be a gardener's dictionary. One may suppose that he would go to the garden not to the herbarium for his material; he found in cultivation this yellow-flowered plant to which, in absence of any Nepalese rose-purple or rose-flowered plants, the name *anthopogon* had become attached, and accepted it as the same as the Gossain Than plants, changing the colour designation in his description. Handbooks of today describe *Rh. anthopogon*, D. Don as yellow-flowered, but in cultivation nowadays under the name *Rh. anthopogon* there are pink-flowered and white-flowered plants, and also yellow-flowered plants. The pink-flowered with the white-flowered plants are not of the same species as the yellow-flowered, and the yellow-flowered plant as I have seen it is not the original and true *Rh. anthopogon*, D. Don.

In 1839 Royle figured\* under the name *Rh. anthopogon*, Don a yellow-flowered plant of which he gives the distribution "Gossain Than and Sereenugur. Wall. Choor, Kedarkanta, and Lipa, etc., in Kunawur." Royle thus accepts the authority of Wallich's Catalogue, and he tells us that he had examined the sheets in the E. I. C. Herbarium. Two points in Royle's figure invite attention—the large yellow flowers and the persistent foliage-bud scale-leaves forming rosettes upon the branches at the base of the several years growth. Assuming that D. Don's descriptions in 1821 and 1825 of the Gossain Than plants are correct, the yellow flower-colour of Royle's plant separates it

\* Royle, Ill. Himal. i (1839), 259, 260, t. 64, f. 2. Royle's book was issued in parts, and the date of publication of this figure would be earlier than that cited, which is the date on the title-page. Issue of the later parts of the work was much delayed.

from them, but it may represent the plant of G. Don's description in 1834. As regards the foliage-bud scale-leaves, they are present on every N.W. Himalayan dried specimen which I have seen of the alliance, and they are absent from every East Himalayan dried specimen. They are not visible on the Gossain Than specimens in the Wallichian Herbarium now at Kew, as Dr. Stapf kindly informs me, and from the same source I learn that they are present on the Badrinath, Srinagar specimens in the same herbarium. I find them on all the yellow-flowered plants of the alliance which are in cultivation at Edinburgh, and they are absent from all our pink-flowered and white-flowered plants.

In 1841 Graham gave an account of *Rh. anthopogon*, D. Don \* based upon living plants flowering at Dysart House, Fifeshire. He says that the plants were obtained from Messrs. Loddiges five years previously and had flowered in three successive years. Graham's description was transferred to the Botanical Magazine in the following year (1842) as text to the illustration t. 3947. The figure shows a plant with "yellowish-white" flowers, and, according to Graham, it differed from Dr. Royle's figure in being of much paler colour, in the segments of the corolla being much broader, overlapping, and undulate, and in the bracts being rusty rather than yellow. The Botanical Magazine figure does not show persistent foliage-bud scale-leaves, and another noticeable point is that the flower truss has comparatively few flowers, many fewer than in the usual bright yellow N.W. Himalayan plant. In the Edinburgh Herbarium are two twigs of the Dysart House plant, unfortunately broken and fragmentary, furnishing no satisfactory evidence for determining their origin from N.W. or E. Himalaya. One would not expect so skilful an artist as Mr. W. Fitch to omit representation of the persistent foliage-bud scale-leaves had they been present on the specimen from which he made his illustration, and if one makes the point critical, then the plant figured was from the East Himalaya. The "yellowish white" flower is of less moment, because in cultivation the colour is sometimes quite pale from the outset in the N.W. Himalayan plant. Graham's text does not help to a decision, for, elaborate though it be, it is not specific within this now very large genus. The data do not suffice for a decision upon the question of what plant the Botanical Magazine figure represents. If Sikkim plants were coming into Britain at so early a date the plant might well be one of them. I have not seen in cultivation a plant of which the figure is a correct representation.

The next important landmark in this history is the advent of the Sikkim Rhododendron in the late 'forties. Of *Rh.*

\* Graham in Edin. New Phil. Journ. xxxi (1841), 394.

*anthopogon*, D. Don, Sir Joseph Hooker says: \* " Nothing can exceed the beauty of its flowers, whether we consider the exquisitely tender, membranaceous, translucent texture of the corolla, with its delicate nervation, or the rich blush of the first opening blossoms, which insensibly passes into snowy white, then faintly tinged with sulphur—all colours seen on one and the same plant." Hooker quotes the Nepal and Kumaon stations of Wallich's Catalogue, and adds that of Sikkim Himalaya. Hooker's account of the flower colour brings us back to the Gossain Than plant of the original description of *Rh. anthopogon*, D. Don. Doubtless, since Hooker's exploration, seeds of the Sikkim plant have reached Britain frequently. Certain it is that we have in cultivation nowadays plants which in their flower colour show the succession of changes observed by Sir Joseph Hooker. But the faint sulphur-yellow tint acquired by the fading white is never like the yellow of the flower of the plant which shows yellow from the outset. Hooker's dried specimens from Sikkim have not got persistent foliage-bud scale-leaves, differing thus markedly from all the N.W. Himalayan plants. Of Sikkim dried specimens in the Edinburgh Herbarium in addition to the Hookerian one, are:—Jongri (T. Anders., No. 767); Yangpoong (Watt, No. 5447); Singaleelah (Watt, No. 5217, flowers lemon green); Ritampoo (Watt, No. 5284, flowers fresh pink; 5293, flowers lemon white, 5418). Observe that Sir George Watt confirms Hooker's account of variation in flower colour. In no one of the Sikkim plants are there persistent foliage-bud scale-leaves. I may add also that Hamilton's No. 1083 from the Snow Mountain in Nepal is also without persistent foliage-bud scale-leaves—about its flower colour there is no information.

I am led by the facts to believe:—

- (a) This Sikkim plant to which Hooker refers is the same as the Nepal one originally described as *Rh. anthopogon*, D. Don. Characters of it are:
  1. The flower colour is pink to white, sometimes on fading becoming slightly sulphur-coloured, but it is not from the beginning dark yellow;
  2. There are never persistent foliage-bud scale-leaves upon it.
- (b) The N.W. Himalayan plant is different. It is not the original *Rh. anthopogon*, D. Don, but is the plant of which George Don says the introduction took place in 1820, and to which he adjusted his description of *Rh. anthopogon* in 1834, ignoring the Nepalese

\* Hook. f., *The Rhododendrons of Sikkim* (1849), Conspect. 7. See also Hook. f. in *Journ. Roy. Hort. Soc. Lond.* vii (1852), 104.

plant. It is the plant to which gardening books so often refer as *Rh. anthopogon*, D. Don. Characters of it are:—

1. Flowers yellow from the outset in large trusses;
2. Foliage-bud scale-leaves are persistent.

More than this, the N.W. Himalayan plant is, as I shall explain presently, that which Maximowicz took to be his *Rh. fragrans*, Maxim. spread into the Himalaya, but it is not that species. It has to be named, and I call it ***Rh. hypenanthum***,\* Balf. f. Specimens of it in the Edinburgh Herbarium are—Kishtwar (T. Thomson, sub nom. *Osmothamnus fragrans*); N.W. India (J. L. Stewart); Keylang, Lahaul (Watt, Nos. 2463, 2504); Kiltu Kunda (Watt, No. 3337); Kukti Village (Watt, No. 2522); Murali (Watt, Nos. 8641, 13,576); Kulu (Watt, No. 13,631); Garhwal (Duthie, No. 941); Kashmir (Duthie, No. 11,021); Galja Byans (Reid); Dakwani (Reid); Bashahr (Lace, No. 231); Chamba (Lace, No. 1578); Kilas (Minniken). A full description of this species will appear shortly.

There is yet to be noted a further confusion of species under the name *Rh. anthopogon*.

The definition of *Rh. anthopogon*, D. Don given by Clarke in the Flora of British India† was not fortunate in the interests of precise knowledge. Instead of sifting relationships of described forms, Clarke seems to have gone to Maximowicz's story of East Asiatic Rhododendrons, and to have transferred to *Rh. anthopogon*, Don the whole of the species therein described by Maximowicz. The outcome of Clarke's combination of forms is that the *Rh. anthopogon* of the Flora of British India becomes a chimaera suggested by four already described species—*Rh. anthopogon*, D. Don, *Rh. fragrans*, Maxim., *Rh. micranthum*, Turcz., and *Rh. parvifolium*, Adams, along with one hitherto undifferentiated species—*Rh. hypenanthum*, Balf. f.—and also probably *Rh. haemonium*, Balf. f. et Cooper.

Franchet‡ has noticed the heterogeneity of the *Rh. anthopogon* of the Flora of British India. When dealing with *Rh. rufescens*, Franch., a West Chinese species, he says:—

“La délimitation spécifique est difficile à établir dans le petit groupe des *Osmothamnus*, dans lequel il n'est guère possible de ne voir qu'une seule espèce, comme l'ont pensé quelques auteurs. Il suffit, pour s'en convaincre, d'examiner

\* *Rh. hypenanthum*, Balf. f.—Species *Rh. anthopogoni*, Don persimilis sed alabastris perulis per annos plurimos verticillatim persistentibus floribusque ab initio aureo-luteis facile distinguenda.

† Clarke in Fl. Brit. Ind. iii (1882), 472.

‡ Franchet in Journ. de Bot. ix (1895), 397; also in Bull. Soc. Bot. France, xxxiv (1887), 284.

la synonymie du *Rh. anthopogon*, Don, telle qu'elle a été établie dans le 'Flora of British India.'"

I need say no more here about the parts of Clarke's combination that are to be segregated as the true *Rh. anthopogon*, Don, and *Rh. hypenanthum*. Of the others:—

*Rh. fragrans*, Maxim. finds its nearest alliance with *Rh. anthopogonoides*, Maxim. and other Chinese species. See on p. 293.

*Rh. parvifolium*, Adams is not a near ally of *Rh. anthopogon*, Don. It belongs to the Lapponicum series, represented outside Asia as well as in W. Asia by *Rh. lapponicum*, in the Himalayas by *Rh. nivale*, Hook. f. and in West China, where it seems to attain its maximum of over a score of species. See p. 299.

*Rh. micranthum*, Turcz. is a species which has been much misunderstood—it is neither in the Anthopogon nor the Lapponicum series.

*Rh. haemonium*, Balf. f. et Cooper may be best described as an Eastern form of *Rh. hypenanthum* of the Western Himalaya. The plants in dried specimens are not unlike, but the Bhutan plant never has the persistent foliage-bud scale-leaves of *Rh. hypenanthum*, and is recognisable at sight. They both have the same intensely yellow corolla. From Northern and Eastern Sikkim there are specimens in the Edinburgh Herbarium which are probably this species *Rh. haemonium*, and possibly some of such Sikkim plants may have been included in the aggregate that appears as *Rh. anthopogon*, D. Don in the Flora of British India. *Rh. haemonium* is certainly not the true *Rh. anthopogon*, Don, and is very different from the S.W. Sikkim plants of the group.

#### FRAGRANS SERIES.

I give the name *Fragrans* to a series of species distinguished from those of *Anthopogon* by never having agglutinate rufescent under-leaf indumentum, and from those of *Cephalanthum* by never having a lax open fawn-coloured under-leaf indumentum. The general characters of the series are:—

Aromatic shrubs with short-stalked small leathery leaves ultimately dark green above and pale fulvous beneath, with peltate shortly stalked uniform scales producing a compact not loose or agglutinated surface of scales; the umbo of the scales usually with a bright yellow ring of secretion and girt by a narrow few-armed fringe. Many scales of the twigs and petioles lose their disks, becoming setae. Bracts of the capitate umbel lepidote and fringed falling after flower-opening. Calyx unequally lobed. Corolla fleshy, villous at throat, glabrous outside, rose, white, or yellow. Stamens puberulous. Ovary



and style very short, style the shorter, ovary always lepidote, but scales soon becoming agglutinated.

The following species belong to the series :—

<i>Rh. anthopogonoides</i> , Maxim.	Kansu.
<i>Rh. clivicolum</i> , Balf. f. et W. W. Sm.	Yunnan, N.E. of the Yangtze bend. 11,000–12,000 ft.
<i>Rh. cremnophilum</i> , Balf. f. et W. W. Sm.	Yunnan—Chungtien plateau. 13,000 ft.
<i>Rh. fragrans</i> , Maxim.	E. Siberia.
<i>Rh. primulaeflorum</i> , Franch.	Tibet: between Lhasa and Batang.
<i>Rh. trichostomum</i> , Franch.	Szechwan: Tungngolo and Tatsienlu.

#### KEY TO THE SPECIES.

1. Leaves 3 cm. or more long. Flowers white to yellow. Inflorescence axis puberulous . . . . . 2.  
Leaves under 3 cm. long. Flowers rose to white. Pedicels lepidote . . . . . 4.
2. Bracteoles longer than calyx . . . . . *primulaeflorum*.  
Bracteoles about equalling calyx . . . . . 3.
3. Pedicels hairy. Calyx elepidote . . . . . *anthopogonoides*.  
Pedicels lepidote. Calyx lepidote . . . . . *clivicolum*.
4. Inflorescence axis lepidote. Calyx lobes elepidote, fimbriate-setulose . . . . . *fragrans*.  
Inflorescence axis puberulous . . . . . 5.
5. Calyx lobes lepidote, ciliate, 4 mm. long . . . . . *cremnophilum*.  
Calyx lobe elepidote, scale-fimbriate, 2 mm. long . . . . . *trichostomum*.

None of these species are in cultivation.

*Rh. fragrans*.—So long ago as 1808 Adams described and figured \* under the name of *Azalea fragrans*, Adams a plant with rose-coloured flowers from the banks of the Lena in

\* Adams in Mém. Acad. Petersb., ii (1808), 332, t. 14. The following is the description given by Adams :—

*Azalea fragrans*, Adams.—A. foliis reguloso-punctatis subtus discoloribus, ellipticis, obtusis; floribus (10–v 15) subcapitatis, genitalibus inclusis.

Fruticulus pedalis et ultra, erectus; ramis patentibus. Caulis crassitie pennae cygneae, ligno albicante; cortice griseo-fusco, per senectutem secedente, laevi, ramulorum tuberculoso scabro; ramulorum annotinorum leviori, ferrugineo-tomentoso. Rami, ramulique terni, quaternique e summitatibus ramorum anni praecedentis. Folia in ramulis sparsa, conferta, sempervirentia, breviter petiolata; petiolo ferrugineo-pubescente, elliptica, obtusa, integerrima, margine revoluta, supra glabra, viridia, nervo medio et venis depressis et inde rugosula, subtus squamulis minutissimis irregularibus ferrugineis vestita, nervo prominulo, leviora, caeterum patentissima, semipollicaria et ultra, amoene fragrantia, aromatica. Capitula in ramulis, supra ortum gemmarum terminalia, tecta squamis ramentaceis, ovatis, obtusis, firmis, fusco-ferrugineis, tomentosulis, ciliatis, deciduis. Antheris cum ineunte vernatione coetanea, floribus 10–15 e capitulis erumpentibus, brevissime pedunculatis, singulis ad basin bractea ramen-

Eastern Siberia. Well described the plant is, although as Maximowicz has pointed out the figure leaves something to be desired. In 1838\* De Candolle established the genus *Osmothamnus* to include Adams' species as well as a plant with white flowers from the Baikal Alps which Turczaninow its collector regarded as a distinct species. To these plants De Candolle gave the names respectively *O. fragrans*, DC. and *O. pallidus*, DC. When in 1870 Maximowicz published his revision of East Asiatic *Rhododendrons*,† he sank *Osmothamnus* in *Rhododendron* and combined De Candolle's species in one *Rh. fragrans*, Maxim. At the same time Maximowicz extended the distribution of the species by including, in addition to plants from many stations in Eastern Siberia, a plant collected by T. Thomson at Kishtwar in the N.W. Himalayas. He qualifies the identification, it is true, by the comment upon the dried specimen, "spec. flor. fere destr.," a remark no less applicable to the specimen in the Edinburgh Herbarium. I suspect that Maximowicz may have been influenced in this determination by the fact that Thomson's specimens are named on the sheet *Osmothamnus fragrans*, DC. But Thomson's Kishtwar plant is not *Rh. fragrans*, Maxim. It is yellow-flowered, not rose-flowered or white-flowered, and it has persistent foliage-bud scales, which are absent from *Rh. fragrans*, Maxim., and shows many other points of difference.‡ We must look upon

tacea, ciliata mox emarcida vestitis. Pedunculus vix semilineam longus, squamuloso-tuberculatus, versus medium bracteis duabus linearibus, ciliatis, pubescentibus, mox emarcidis, lineam longis, ferrugineis instructus. Calyx hypogynus, brevissimus, glaber quinquangularis, basi gibbus, tubo triplo brevior, persistens, quinquefidus; laciniis erectis, subovatis, acutiusculis, vix margine pubescentibus. Corolla hypogyna, saepius decidua, semi-pollicaris, glabra, infundibuliformis; tubo ferrugineo-variegato, supra medium gibbo; fauce sensim ampliata et limbo roseo-purpureis: Limbi patentes, quinquefidi, lacinae suborbiculatae, vix ac ne vix quidem crenulatae, tenuissime venulosae. Stamina quinque, perigyna, immo calyci affixa, subaequalia, tubo parum breviora, glabra, subsistentia; filamentis filiformibus; antheris erectis, bilocularibus. Pistillum staminibus duplo brevius, vix calyce longius, ovaria subglobosa, sulcis quatuor obliteratis, stylo brevissimo, stigmatem ampliato-depresso. Capsula subglobosa, quadrilocularis, quadrivalvis, quadrisulcata, ad margines valvarum introflexos septa constituentes, chordaeque pistillari ante maturitatem affixos. Valvulae apice sulco obliterato. Semina numerosa, linearia, minuta, fusca congenerum.

Habitat in provinciis septentrionalibus Sibiriae orientalis usque ad littora maris glacialis, ubi specimina florentia mense Julio legi.

Proxima *Azaleae lapponicae*; differt caule robustiore, foliis majoribus floribus numerosis, brevissime pedunculatis, genitalibus que inclusis, quae in *A. lapp.* cum mascula, tum foeminea, exserta.

Odor praestantissimus aromaticus, accedens ad *Rhododendri daurici*.

\* De Candolle, Prod., vii (1838), 715.

† Maximowicz, *Rhododendr. As. Orient.* (1870), 16.

‡ As Franchet points out in Bull. Soc. Bot. Fr. xxxiv (1887), 285, where he describes *Rh. fragrans* var. *parvifolia*, a plant referred by Rehder and Wilson to *Rh. trichostomum*. I have no material upon which to form an independent opinion.

*Rh. fragrans*, Maxim. as an Eastern Siberian species only, for Thomson's Kishtwar plant is *Rh. hypenanthum*, Balf. f., of the Anthopogon series. Whilst taking a N.W. Himalayan plant which had been for so long confused with *Rh. anthopogon*, Don as part of *Rh. fragrans*, Maximowicz differentiated *Rh. anthopogon*, Don itself, for he says of *Rh. fragrans*: "*Anthopogoni non parum affine*," and gives diagnostic characters. In this Maximowicz was right, and the differences are even greater than he stated them to be. *Rh. fragrans* belongs to a group other than that of Anthopogon. Notwithstanding Maximowicz's precise statements, C. B. Clarke,\* when dealing with *Rh. anthopogon*, Don as an Indian plant, brought *Rh. fragrans* (with its synonymy as given by Maximowicz) into the chimaera which he created under the name *Rh. anthopogon*. See p. 291.

*Rh. fragrans* does not appear as a plant of cultivation, and I do not suppose it has any features making it more desirable in horticulture than many of the aromatic shrubs of the Anthopogon and the Cephalanthum series. It must not be confused with the *Rh. fragrans*, Hort. which, according to De Candolle,† is only the American *Rh. maximum*, Linn. The scent there comes from the flower; in Maximowicz's plant from the vegetative shoots. In the herbarium at Kew are specimens of *Rh. fragrans*, Maxim. collected by Adams at the Lena and by Turczaninow between Jakutzk and Ochotzk, and in the herbarium of the British Museum there is also a specimen from Eastern Siberia. To the heads of these herbaria I am indebted for allowing me to examine the specimens from which I have made up the following description of *Rh. fragrans* which may be of use in further critical study of this series of Rhododendrons:—

*Rhododendron fragrans*, Maxim.—Small aromatic shrub about 30 cm. or more high erect with many spreading branches. Branches a year old about 1.5 mm. in diameter densely clad with a fulvous coating of peltate scales with some setae formed by the stalks of scales from which the disk has fallen. Older branches slightly scabrid then becoming dirty grey and ultimately the hard bark splits off. Buds small with few scale-leaves ovoid, scale-leaves falling early; outer scale-leaves about 3 mm. long ovate acute mucronulate keeled crustaceously coriaceous fulvously lepidote along the keel elsewhere adpressedly puberulous, margin slightly membranous and very finely shortly ciliate puberulous inside, inner scale-leaves oblong spatulate submembranous with a median vein but hardly keeled and hardly mucronulate about 5 mm. long and 2 mm. broad outside puberulous, margin finely ciliate inside puberulous. Leaves up to 2 cm. long

\* Clarke in Flora of Brit. Ind., iii (1852), 472.

† De Candolle, Prod., vii (1838).

shortly petiolate; blade oblong or elliptic-oblong narrow to each end about 1.6 cm. long and 8 mm. broad thick leathery with a small apical mucro, margin slightly revolute slightly roughened by bases of fallen scales, base obtuse or very slightly rounded; upper surface dark green midrib sulcate elsewhere slightly rugulose but primary veins not particularly conspicuous, more or less marked by pittings or greyish fragments (the remains of peltate scales which densely covered the young leaf); under-surface fulvous never rufescent the midrib slightly elevated and covered like the rest of the smooth surface by peltate persistent scales these are contiguous overlapping each having an umbo which develops a yellow content girt by a narrow lobed fringe, the scales are not agglutinated; petiole about as much as 4 mm. long usually shorter densely lepidote. Flowers racemously arranged about 10-15 together in small terminal trusses, axis of inflorescence lepidote with setae formed from the scale-stalks; the outer bracts rounded about 5 mm. broad fulvous not keeled but somewhat apiculate with a somewhat, membranous ciliate margin lepidote on the back and puberulous inside; the inner bracts ramentaceous obovate spatulate about 5 mm. long and 4 mm. broad lepidote on back lanate-ciliate puberulous inside; prophylla linear claviform about 4.5 mm. long longer than the calyx; pedicels about 1.5 mm. long lepidote. Calyx small and variable cut to nearly the base into five lobes sometimes 2.5 mm. long sometimes about 1 mm.; the cup is saucer-shaped and glabrous outside, lobes from deltoid to ovate to oblong or elongate triangular longer ones perhaps 1 mm. broad membranous or if short rigid with a few or no peltate scales outside, margin in longer ones lepidote-fimbriate in smaller ones with long setae at top even longer than the lobe itself. Corolla about 1.2 mm. long membranous throughout hardly oblique, tube glabrous outside pubescent inside about 8 mm. long expanding into a rosy purple spreading limb cut into 5 rounded lobes hardly crenulate and about 6 mm. in diameter. Stamens 5 about 7 mm. long nearly as long as corolla tube, filaments dilated downwards and at base puberulous, anthers small oblong barely 1 mm. long. Ovary conoid 5-lobed and densely lepidote about 1.5 mm. long; style stout clavate about 0.75 mm. long crowned by a lobed stigma.

I am puzzled over one character. Adams says—and Maximowicz makes a point of the character—that the stamens are glabrous. I do not find them so. The Anthopogons, excepting *Rh. rufescens*, Franch., have glabrous stamens. The whole series to which *Rh. fragrans* belongs has puberulous stamens. In its rose-coloured (sometimes white) flowers *Rh. fragrans* resembles *Rh. cremnophilum*, Balf. f. et W. W. Sm., but its

habit, larger leaves and their form, its shorter bracts, and lepidote pedicels easily distinguish it.

*Rh. anthopogonoides*, Maxim., is another little known species of the *Fragrans* series. It was collected in Kansu by Przewalski in 1872, and so far as I know by no one since that date. I expected that Mr. Farrer would have found it during his recent expedition and have introduced it to cultivation. The only small *Rhododendron* at all resembling it which I have seen in Mr. Farrer's collection is *Rh. praeclarum*, Balf. f. et Farrer, a new species of the *Cephalanthum* series. See pp. 261, 317. I give here for comparison a description of Maximowicz's species—not that I have much material upon which to base an account of it. I have only one specimen, presented to the Edinburgh Herbarium by Maximowicz and named by himself, so that I am sure of the plant to which he gave the name.\*

Small shrub copiously and fastigiately branched. Branchlets a year old densely coated by peltate resinous-centred scales and also by short setae formed by the stalks of scales from which the disk has fallen; older twigs blackening and showing remains of scales and setae afterwards shedding the bark. Foliage-buds ovoid small coated by small fulvous outer scale-leaves densely lepidote outside with short resinous scales. Leaves about 3.5 cm. long petiolate; lamina thick coriaceous about 3 cm. long and as much as 2 cm. broad elliptic mucronate at apex margin slightly revolute entire slightly roughened by the bases of juvenile scales or setae which have fallen off, base obtuse or somewhat truncate or with lobes slightly rounded; upper surface opaque midrib and primary veins more or less sulcate; under surface never rufescent at most a pale rusty brown densely lepidote the peltate scales uniform contiguous with umbo more or less orange-

\* Maximowicz, in Mém. Biolog. ex Bull. Acad. Imp. Sc., St. Petersb., ix (1876), 772, describes the plant as follows:—

*Rhododendron anthopogonoides* (*Osmothamnus*, Maxim.).—Pumilum inordinate fastigiatum; ramis juventute puberulis cum tegmentis medio dorso parcius foliisque subtus dense (juvenilibus etiam supra parce) lepidotis. his demum subtus pallide ferrugineis; foliis biennibus ovalibus v. ellipticis utrinque, basi truncato-apice mucronato-obtusis coriaceis opacis, margine revolutis; corymbis hemisphaericis densis ad 20-floris; floribus breve pedicellatis; tegmentis sub anthesi mox deciduis calyce longioribus rotundatis truncatis margine ciliatis interioribusque dorso sericeis; calyce 5-partito lobis foliaceis ciliatis oblongo-ovatis tubo corollae duplo brevioribus; corollae flavae subhypocraterimorphae tubo cylindrico leviter recurvo limbum lobis depressorotundis triplo superante intus villosobarbato; staminibus 5 tubo duplo brevioribus filamentis subulatis ad medium pilosis, antheris oblongis; stylo duplo brevioribus sursum subincrassato; ovario lepidoto 5-mero.

In Chinae prov. Kansu (Przewalski, 1872).

*Rh. anthopogoni*, Don propius quam *Rh. fragrantis*, Maxim., ob folia majora, ramos inordinatos, corollae colorem, sed ab utroque bene distinctum limbo corollae parvo, filamentis pilosis.



coloured and resinous and the fringe always frayed, the whole indumentum compact the midrib elevated and more or less lepidote; petiole about 5 mm. long lepidote. Flowers some 20 in a small dense hemispheric truss with a short puberulous axis; bracts early deciduous outer ones crustaceous fulvous about 6 mm. long and 8 mm. broad more or less rounded carinate mucronulate outside lepidote, margin finely ciliate within puberulous; inner bracts obovate spatulate membranous about 8 mm. long 4 mm. broad outside softly puberulous and at the top lepidote also ciliate at margin with twisted hairs inside puberulous; prophylla about 8 mm. long equalling the calyx filiform and clavate expanded at the top where they are ciliate elsewhere puberulous not lepidote; pedicels about 2 mm. long puberulous and elepidote. Calyx campanulate 5 mm. long cut to beyond the middle, lobes often slightly spreading at top thinly membranaceous green oblong ovate or oblong as much as 2.5 mm. broad acute erose and fimbriate-ciliate outside elepidote inside puberulous. Corolla yellow 1.4 cm. long slightly fleshy with a narrow tube slightly oblique curved forward 8 mm. long in front glabrous outside shaggy and villous inside and at throat dilated upwards expanding into an oblique limb with 5 rounded imbricate slightly crenulate lobes some 3.5 mm. in diam. Stamens 5 about 6 mm. long the filaments dilated downwards and puberulous at base, the anthers oblong and 1 mm. long. Ovary 5-grooved and densely lepidote the scales ultimately sticky about 1.75 mm. long; style claviform green about 1.25 mm. long crowned by a lobed stigma.

*Rh. anthopogonoides* seems to be nearest to *Rh. clivicolum*, Balf. f. et W. W. Sm. Both of them have yellow flowers, but the puberulous elepidote short pedicels and elepidote calyx, smaller corolla associated with larger leaves distinguish *Rh. anthopogonoides*.

#### LAPPONICUM SERIES.

The following general characters mark the species in this series:—

Carpet, cushion or dwarf erect shrubs with small leaves usually. Twigs lepidote the scales shortly stalked never losing the disk and becoming setae. Foliage-bud scale-leaves never persistent. Vernation complanate or convolute. The leaves lepidote on both sides, the under indumentum always compact never loose and spongy. Fringe of the scales usually as wide as the umbo and entire. The inflorescence a terminal capitate umbel 1-7-flowered. Flowers small. Flower-bud scale-leaves remaining during flowering. Pedicels very short. Calyx cut to base with membranous lobes varyingly lepidote, puberulous, ciliate or scale-

fimbriate. Corolla usually rose-violet to purple (yellow in only two species), lepidote or glabrous outside; tube usually a short funnel commonly hairy inside; limb open concave. Stamens 5-10 exserted (see two exceptions) with hairy filaments. Ovary lepidote sometimes with hairs also; style glabrous or hairy (lepidote in one species), usually longer than stamens and corolla.

The species that belong to the Lapponicum series are in the following list, and I give the geographical distribution of each as it is known to us:—

- |   |  |
|---|--|
| <i>Rh. achroanthum</i> , Balf. f.                 | Yunnan: Chungtien plateau, 12,000-13,000 ft.   |
| <i>Rh. alpicolum</i> , Rehd. et Wils.             | Szechwan: Tatsienlu, 12,000-15,000 ft.   |
| <i>Rh. blepharocalyx</i> , Franch.                | Szechwan: Tatsienlu.   |
| <i>Rh. capitatum</i> , Maxim.                     | Kansu.   |
| <i>Rh. chryseum</i> , Balf. f. et Ward.           | Tibeto - Yunnan frontier: Ka-gwr-pw Glacier Valley, 13,000-15,000 ft.  |
| <i>Rh. complexum</i> , Balf. f. et W. W. Sm.      | Yunnan: Chungtien plateau, 11,000-12,000 ft.   |
| <i>Rh. cuneatum</i> , W. W. Sm.                   | Yunnan: Lichiang Range, E. flank, 12,000 ft.; Lichiang, 11,000-13,000 ft.; Chungtien plateau, 10,000-11,000 ft.; N.E. of Yangtze bend, 10,000-11,000 ft.                     |
| <i>Rh. diacritum</i> , Balf. f. et W. W. Sm.      | Yunnan: Chungtien plateau, 13,000-14,000 ft.   |
| <i>Rh. drumonium</i> , Balf. f. et Ward.          | Yunnan: Chung River Valley, 10,500 ft.   |
| <i>Rh. Edgarianum</i> , Rehd. et Wils.            | Szechwan: Tatsienlu, 11,000-15,000 ft.   |
| <i>Rh. fastigiatum</i> , Franch.                  | Yunnan: Tali, 11,000-12,000 ft.; Tali, E. flank, 12,000-13,000 ft.; W. flank, 12,000 ft.; summit of Sung Kwei Pass, 11,000-12,000 ft.  |
| <i>Rh. flavidum</i> , Franch.                     | Szechwan: Tongolo, 11,000-13,000 ft.   |
| <i>Rh. hippophaeoides</i> , Balf. f. et W. W. Sm. | Yunnan: Chung River Valley, 10,500 ft.; W. of Fengkow Valley, 12,000 ft.; Chungtien plateau, 14,000 ft.; N.E. of Yangtze bend, 11,000-12,000 ft.; Lichiang Range, 10,000 ft. |

- Rh. idoneum*, Balf. f. et W. Yunnan : Chungtien plateau, 13,000–14,000 ft.  
W. Sm.
- Rh. impeditum*, Balf. f. et Yunnan : Lichiang Range,  
W. flank, 12,000–13,000 ft. ;  
E. flank, 15,000–16,000 ft.  
W. W. Sm.
- Rh. intricatum*, Franch. Szechwan : Tatsienlu.
- Rh. lapponicum*, Wahlenb. Greenland ; Lapland ; Scandinavia ; N. Canada.
- Rh. nigropunctatum*, Franch. Tibet : Route from Lhasa to Batang.
- Rh. nitidulum*, Rehd. et Wils. Szechwan : Muping, 10,000–12,000 ft.
- Rh. nivale*, Hook. f. Sikkim ; Bhutan.
- Rh. oresbium*, Balf. f. et Tibeto - Yunnan frontier :  
Ward. Doker La, 13,000–15,000 ft.
- Rh. parvifolium*, Adams. E. Siberia.
- Rh. polifolium*, Franch. Szechwan : Tatsienlu.
- Rh. polycladum*, Franch. Yunnan : Tali, Hoching, 9000 ft.
- Rh. pycnocladum*, Balf. f. et Yunnan : Lichiang Range,  
W. W. Sm. E. flank, 10,000–11,000 ft.
- Rh. ramosissimum*, Franch. Tibet : between Lhasa and Batang.
- Rh. rupicolum*, W. W. Sm. Yunnan : Chungtien plateau, 12,000–13,000 ft. ;  
Kari Pass, Mekong-Yangtze Divide, 12,000–13,000 ft. ;  
Mekong-Yantze Divide, 15,000 ft. ; N.E. of Yangtze bend, 13,000–14,000 ft. ;  
Lichiang, W. flank, 14,000 ft.
- Rh. scintillans*, Balf. f. et Yunnan : Lichiang Range,  
W. W. Sm. 11,000–14,000 ft. ; Lang-kong-Hoching Pass, 11,000 ft.
- Rh. tapetiforme*, Balf. f. et Tibeto - Yunnan frontier :  
Ward. Ka-gwr-pw, 15,000 ft.
- Rh. telmateium*, Balf. f. et Yunnan : Chungtien plateau, 12,000 ft. ; Fengkow Valley, 10,000–11,000 ft.  
W. W. Sm.
- Rh. thymifolium*, Maxim. Kansu.
- Rh. verruculosum*, Rehd. et Szechwan : W. of Kuan  
Wils. Hsien, 10,000 ft.
- Rh. Websterianum*, Rehd. et Szechwan : Tatsienlu, 10,000–15,000 ft.  
Wils.
- Rh. violaceum*, Rehd. et Wils. Szechan : W. of Kuan  
Hsien, 12,000–13,000 ft.

Of the thirty-four species named, only three are known outside of China: *Rh. lapponicum*, *Rh. nivale*, and *Rh. parvifolium*. That we are yet far from knowing all the species of the series we may be certain. Already we have in Edinburgh specimens that do not well fall into any of these described species, but which cannot be described because of the lack of critical parts. The group is a difficult one. To casual observation several of the species resemble one another almost to the degree of identity. Until they can all be studied as living plants there will be unsolved questions about them. At the present time, to my knowledge, the following species are in cultivation:—*Rh. cuneatum*, *Rh. fastigiatum*, *Rh. flavidum*, *Rh. hippophaeoides*, *Rh. idoneum*, *Rh. impeditum*, *Rh. intricatum*, *Rh. lapponicum*, *Rh. nivale*, *Rh. parvifolium*, *Rh. rupicolum*, *Rh. scintillans*. Doubtless there are more, because more than one species has on occasion appeared in one seed pan. There is no little confusion amongst the cultivated forms. *Rh. fastigiatum* covers more than one species. *Rh. Edgarianum* as it has come to us includes two distinct plants, neither of them the right one, and therefore I have omitted it from this garden list. *Rh. intricatum* also is a name including two or three species of our gardens. *Rh. nigropunctatum* is not in the list. I have not seen it either alive or in herbaria, and doubt if it has ever been in cultivation. Rehder and Wilson say that the plant formerly grown under the name is *Rh. intricatum*.

I have seen, thanks to the kind co-operation of M. Lecomte in Paris, types of all Franchet's species excepting *Rh. nigropunctatum* and *Rh. ramosissimum*; I have also seen specimens of all Rehder and Wilson's species, unfortunately only in small amount: Maximowicz enriched our collections many years ago by samples of his species, and along with all these I have had the rich spoil of the exploration by Forrest and Kingdon Ward. If I attempt to sift the characters of the species and to find affinities within the series, it is mainly in the hope of helping cultivators by giving them at least in some cases easily observed marks of distinction by which to recognise their plants. Before proceeding to this analysis it may be helpful if I elaborate the brief outline given above of the characters of the series.

We have in the series carpet-forming species which are well illustrated by the name-species of the series *Rh. lapponicum* and by the Himalayan *Rh. nivale*, plants which live for a greater part of the year under snow, and by *Rh. tapetiforme* and *Rh. drumonium*. Of the taller shrubby forms, *Rh. parvifolium*, *Rh. capitatum*, and others represent those which have elongated tapered leaves of some size. The dwarf cushion habit with gnarled twisted branches is a growth form that is adopted

by a large number of the species, e.g.—*Rh. fastigiatum*, *Rh. impeditum*, *Rh. scintillans*. I note that many of this type have the discontinuous under-leaf scales. A most graceful growth form is that shown by such plants as *Rh. diacritum*, *Rh. telmateium*, *Rh. thymifolium*, which have very thin erect twigs bearing rather small leaves, and these have punctulate under-leaf indumentum.

In relation to cultivation of Rhododendrons in our gardens the series has special interest, for we have, according to the collectors, species which grow in clefts of limestone cliffs—such are *Rh. cuneatum*, *Rh. pycnocladum*, and *Rh. rupicolum*. Diverse from these in nidus are *Rh. hippophaeoides* (boggy peaty pasture), *Rh. impeditum* (open peaty pasture), *Rh. scintillans* (open marshy pasture), and *Rh. telmateium* (open boggy situations), and then *Rh. diacritum* is said to come from humus-covered boulders. Here, then, are species whose native habitat is definitely recorded—limestone in one set, peat and marsh in the other—and as *Rh. cuneatum* and *Rh. rupicolum* of the lime plants and *Rh. hippophaeoides*, *Rh. impeditum*, and *Rh. scintillans* of the moist peat plants are in cultivation, comparative experiment upon their growth in relation to soil conditions is possible, and may throw some light upon the problem of "Rhododendrons and lime."

In all the species the short leaf-petiole is erect and is nearly adpressed to the stem so that the lamina stands off from the petiole at a considerable angle. In *Rh. cuneatum* alone do the leaves reach any great size. There they may be 6 cm. long and nearly 2 cm. broad. In the high alpine, *Rh. nivale*, for instance, they are very small—may be only a couple of millimeters across.

The tint of the actual leaf surface above is dark green, beneath it is paler because there the epidermis always produces papillae coated with small particles of wax,\* and these may give a glaucous look to the surface. The real tint of the leaf is obscured because both surfaces are covered with peltate scales forming an indumentum. The general construction of these scales is alike in all. There is a short stalk of several cells, often in two vertical rows, and this stalk expands above into a many-celled umbo, from the margin of which there extends all round a fringe of empty cells so connected as to run together to the margin of the fringe and to end altogether there, so that the edge is smooth and not toothed. The fringe is radially as broad as the umbo. This umbo may contain a resin-like excretion, which may become tinted yellowish, amber-coloured, or red, and is then glistening, or it may remain unmarked by change in content, and then the surface of the umbo is not glistening or sometimes the point

\* As Mr. Tagg, Assistant in our Museum, who is studying indumenta of Rhododendrons, points out.



where the umbo passes into the fringe becomes tinted and there appears to be a ring of resin-like substance. The fringe itself may remain uncoloured and whitish, or it may change to a brown colour—the cell-walls here altering. These scales are at first whitish all over, both on top of and below the leaf lamina. The scales on the upper surface are almost superficial. By that I mean they are not sunk in deep pits. The upper leaf-surface may be undulate and the scales may come off from the depressions, but they are always raised above the surface so that the fringe spreads more or less horizontally over it. These scales may shrivel up on the old leaves remaining as a greyish debris making the surface somewhat hoary, or may fall off and leave only a trace of their existence in the undulation of the surface or in greyish shreds, or they may, if the umbo becomes resinous, remain as scintillating disks spread over the surface. As to how far the difference is to be regarded as associated with any particular environment or as a specific character there is insufficient evidence.

The form and distribution of the scales on the under-leaf surface furnishes a mark of much value in the diagnosis of species. The scales of the mould already mentioned may be *contiguous* or *discontiguous*. The area of exposed leaf epidermis where the scales are discontiguous is about the same as, or more than, that of the scales. There are states when the scales are not quite contiguous and there are left narrow chinks between the scales. For purposes of description this state is treated as contiguous. Where the scales are contiguous the fringes of adjacent scales may not merely touch but overlap in an imbricate fashion. By this character of contiguity or discontiguity of scales we can at once diagnose groups of species. Where the scales are contiguous they are essentially superficial; where discontiguous they are sunk in pits, and this sinking affects the appearance of the scale—because if the pit be deep the length of the stalk of the scale may be less than the depth of the pit; the umbo of the scale is then depressed and the fringe may be turned upwards and only slightly overlap the leaf-surface. Such sunk scales are readily recognised. The evident function of all scales is water conservation through the layer of still air they maintain over the leaf-surface. The wax-bearing epidermal papillae appear to be much better developed in the discontiguous species than in the contiguous ones.

There are yet other interesting features to notice of this indumentum on the under-leaf surface. In some cases the contiguous scales are large and all of about the same form, size, and colour, and their imbrication gives the effect that one observes in such scale-covered leaf-surfaces as occur in *Elaeagnus*,

species of *Croton*, and others. This is well represented in *Rh. cuneatum*, *Rh. hippophaeoides*, *Rh. idoneum*, *Rh. intricatum*, *Rh. polifolium*, *Rh. tapetiforme*, *Rh. Websterianum*. One speaks of the scales as *uniform* or *concolorous*. The surface may be grey-coloured, or if the scales are tinted brown it becomes a bright brown or a rusty brown. But in some cases, e.g., *Rh. achroanthum*, *Rh. capitatum*, *Rh. chryseum*, *Rh. rupicolum*, about half of the scales equally distributed over the leaf-surface become tinted brownish and are intermixed with the other half, which remain whitish or grey-green. There appear to be two kinds of scale. But the scales are all of the same build; it is in the coloration that there is difference, and also in the stalks, which in the brown scales are a little longer and the scale-disks are therefore projected somewhat beyond their untinted fellows. And then we pass to species in which only a few of the scales develop longer stalks and become brown, as in *Rh. diacritum*, *Rh. drumonium*, *Rh. nigropunctatum*, *Rh. nivale*, *Rh. pycnocladum*, *Rh. telmateium*, *Rh. thymifolium*, and others, so that the greyish or brownish leaf-surface is picked out with dark brown spots—it is *punctulate*. We speak of the scales in the two cases last described as *biform* or *bicoloured*. What functional meaning, if any, there is in the modification is not evident, unless it be that the projection of many or few of the contiguous scales secures more free communication between the stomata and the atmosphere—a suggestion the validity of which is questioned by the occurrence of like disposition on leaf-surfaces where the scales are discontinuous. Leaf under-surfaces with discontinuous scales may appear grey or tinted brown or brown mixed with green. The grey and green of the surface depends upon the area of surface exposed between the scales and the development of wax on the epidermal papillae; the brown tint is a consequence of the coloration of the scales.

Examination of dried specimens and of the few species that are in cultivation tells me that this indumentum character of the old leaves is a good basal one of definition.

The twigs of all the Lapponicum *Rhododendrons* are alike. They may be longer or shorter, but are all coated with a rusty indumentum of peltate scales which peel off like scurf.

In no one of the Lapponicum series have I found on the stems and petioles the very long-stalked peltate scales which lose sooner or later their disk—the stiffened stalk becoming thereafter a longer or shorter seta. These setulose scale-stalks are well developed in the *Anthopogon*, *Fragrans*, and *Cephalanthum* series. See what I say on p. 318. In this Lapponicum series the scale-remnant sometimes forms a little wart on the branchlets before the grey bark begins to shred off, but that is all.

The foliage-buds are all small, more or less oblong, with two or three small thick rusty lepidote scale-leaves outside and spatulate thinner ones within. The scale-leaves fall off at once on opening of the bud. None of them persist. The ptyxis of the leaves in the bud is involute or they may be plane, and the vernation is correspondingly implicate or complanate. This character in the bud is a tribe distinction of all these small-leaved Rhododendrons, marking them off from the whole of the large-leaved Rhododendrons, which have revolute ptyxis and a curious valvate vernation of the leaves within a hollow chamber formed by the numerous scale-leaves of the bud.

The flowers are produced at the end of shoots either as solitary terminal flowers with hardly any stalk, or in groups of 2-7 flowers equally and short-stalked. Where there are several flowers at the end of a twig they belong to one truss; there are never lateral accessory trusses or flowers. This is important, separating the group from *Rh. dauricum*, Linn. and forms within its orbit. There may be considerable variation in the number of flowers in a truss in the same species, but apparently some species have constantly a solitary terminal flower, e.g., the whole of the species in sub-series B (see p. 309).

In all cases the flower-bud is more or less globose, the outermost sterile bracts very small ovate and lepidote, the ones within more or less rounded and hooded, mucronate or apiculate or not, lepidote outside and ciliate or lanate at margin and top. Variations there are, and investigation must determine whether any point of diagnostic value is to be found in these sterile bracts. They are always more or less persistent until flowering is well over. The innermost spatulate more or less hairy bracts are also wonderfully uniform, as are also the thread-like bracteoles usually longer than the pedicels, which are commonly lepidote, often reddened.

In the flowers themselves the calyx is always cut to near the base into five lobes which are equal or unequal. If the latter, the postero-lateral are the larger. There is much variation in the size of the lobes. Sometimes the smaller are mere points. The larger may be membranous plates 5 millimeters long. They are green or reddened, may be lepidote on the back and margin, and ciliate or lanate at the margin. As Rehder and Wilson have pointed out, forms like these Lapponicum Rhododendrons with sterile bracts remaining during flowering are apt to show divergence within a species in the calyx. One may recognise its oneness for the group, and that certain species have generally say large calyx lobes, others have small ones, but we do not yet know the limits of specific character in the calyx. It is otherwise with the corolla. It shows a short funnel-

like tube in most species, and it opens into a broad funnel limb with five usually crenulate lobes spreading wide open in full flower—the lobes as long as the rest of the corolla, but in three species—*Rh. blepharocalyx*, *Rh. complexum*, and *Rh. intricatum*—the tube is elongated cylindric ventricose at base, constricted at the mouth, and the limb is nearly patent. So distinct is this that the right of these species to a position within the series may be doubted. They form a small group intermediate between the Lapponicum and the Cephalanthum series. The colour varies from rose-pink to purple and violet; in *Rh. chryseum* and *Rh. flavidum* it is yellow—an interesting contrast with the Cephalanthums, in which yellow and white are the dominant colours. The corolla is always lined inside by hairs and two states have to be recognised. The stamens in the funnel flowers project far beyond the mouth of the corolla tube, which is plugged by a mass of hairs in part derived from the corolla tube, in part from the staminal filaments. In the flowers with elongated corolla tube the stamens do not or hardly project from the tube, and no hairs are visible in the open flower. The two states are noticeable at sight. There remains one character of the corolla to notice which is a thoroughly good differentiating one. Some species have the corolla lepidote outside right from the corolla tube to the top of the lobes—sometimes slightly, other times copiously. It is a character I trust. The species in which the lepidote corolla occurs are:—

- Rh. achroanthum*, Balf. f.
- Rh. chryseum*, Balf. f. et Ward.
- Rh. cuneatum*, W. W. Sm.
- Rh. diacritum*, Balf. f. et W. W. Sm.
- Rh. drumonium*, Balf. f. et Ward.
- Rh. flavidum*, Franch.
- Rh. idoneum*, Balf. f. et W. W. Sm.
- Rh. pycnocladum*, Balf. f. et W. W. Sm.
- Rh. rupicolum*, W. W. Sm.
- Rh. telmateium*, Balf. f. et W. W. Sm.
- Rh. verruculosum*, Rehd. et Wils.

In the few cases where the number of the stamens is 5 it seems to be a definite mark for diagnosis. Fluctuations from 8-10 are so common that these higher figures are of no diagnostic import. There are differences in the breadth of the filaments which in dried specimens seem to suggest a differential character, but further investigation must determine this. All the Lapponicum Rhododendrons have hairs upon the filaments. The portion of the filament from the upper third of the ovary downwards is commonly slightly broader and bare of hairs, the region immediately above this and therefore encircling the top of the

ovary is always more or less hairy—frequently each filament has a villous tuft there which projects over the ovary into the tube of the corolla. But the hairs may be few in number or they may spread up the filament to near the top (*Rh. capitatum*). In most of the series the stamens are about equal in length to the corolla—longer or shorter—but in the forms with elongated corolla tube circling round *Rh. intricatum*, Franch. they are not longer than the corolla tube, and there show most markedly the apparent obdiplostemony of so many Ericaceae.

The ovary in all cases is lepidote, but not only so, it may be also pilose. This pilosity is a fluctuating feature. In all cases the top of the toral disk at the base of the ovary is more or less pilose. The hairs may extend upwards over the ovary amongst the scales to the top in a varying degree. Sometimes (*Rh. achroanthum*) they obscure the scales; at other times are hardly visible. From the ovary the hairs may extend to the style nearly through half its length. On the same plant in some a style pilose and one epilose may be found. Yet at times the character is useful. The length of the style in relation to the ovary is of importance. In the forms where the stamens are not exerted from the corolla tube the style is always shorter than the stamens—it may be shorter than its ovary. In forms with long stamens the style may be about equal to them—longer or shorter. Then there is the majority of forms with style consistently much longer than the stamens.

The fruit, apart from variation in size, has the same type in all species of Lapponicum Rhododendron where it is known—an ovoid capsule dehiscent by five woody valves to the base.

Here follows an attempt to arrange the species in grouplets for the purpose of facilitating recognition of them by easily observed characters. The arrangement in sub-series and the keys seem to work all right in relation to dried specimens, and so far as I have tested they are effective for the few species in cultivation. They seem to bring together more or less the nearly allied species. But they are tentative.

#### SUB-SERIES A.

Scales of under-leaf indumentum brown, uniform, truly discontinuous. The species

*Rh. fastigiatum*, Franch.,

*Rh. flavidum*, Franch.,

*Rh. impeditum*, Balf. f. et W. W. Sm.,

*Rh. oresbium*, Balf. f. et Ward,

*Rh. scintillans*, Balf. f. et W. W. Sm.,

*Rh. verruculosum*, Rehd. et Wils.,

*Rh. complexum*, Balf. f. et W. W. Sm.,



may be taken together as forming a sub-series marked by this character of the under-leaf indumentum. The brown scales are truly discontinuous, having conspicuous bare epidermal areas. Let me make quite clear that the area without scales is large, hence the scales are as it were dotted at intervals over the surface, and that the old leaves must be looked at. The leaves in the species of this series vary from elliptic to oblong, and form-differences are useful to distinguish between closely related species; for instance, *Rh. impeditum* has the elliptic type, *Rh. scintillans* the oblong. The flowers in the truss are as a rule few—3-5 in *Rh. fastigiatum*, the largest number, 1 only in *Rh. verruculosum*. Some tint of violet or purple marks the flowers, save in *Rh. flavidum*, where they are yellow. Scales on outside of corolla is an excellent differential mark. Three species have this—*Rh. fastigiatum*, *Rh. flavidum*, *Rh. verruculosum*. I know of no more useful mark than this for distinguishing *Rh. fastigiatum* amongst like forms. Any plant with more than one flower in the truss and with lepidote corolla and that shows discontinuous uniform scales below is *Rh. fastigiatum*. The character will enable anyone to separate out this species from others which are commonly mixed with it in gardens. The 10 exserted stamens and the style longer than the stamens are common marks, with the exceptions of 7-8 stamens in *Rh. verruculosum* and a puberulous style shorter than the stamens in *Rh. oresbium*. *Rh. complexum* is really not in its natural place here, for it has a long tube to the corolla and only 5 stamens which with the style are included, and these are foreign to the Lapponicum group.

#### KEY TO THE SPECIES.

- |   |                       |
|---|-----------------------|
| 1. Corolla lepidote . . . . .                           | 2.                    |
| Corolla elepidote . . . . .                             | 4.                    |
| 2. Flowers yellow . . . . .                             | <i>flavidum</i> .     |
| Flowers purple tinted . . . . .                         | 3.                    |
| 3. Inflorescence 1-flowered . . . . .                   | <i>verruculosum</i> . |
| Inflorescence 3-5-flowered . . . . .                    | <i>fastigiatum</i> .  |
| 4. Stamens and style included in corolla tube . . . . . | <i>complexum</i> .    |
| Stamens and style exserted . . . . .                    | 5.                    |
| 5. Style hairy, shorter than stamens . . . . .          | <i>oresbium</i> .     |
| Style glabrous, longer than stamens . . . . .           | 6.                    |
| 6. Leaves elliptic, rounded at each end . . . . .       | <i>impeditum</i> .    |
| Leaves oblong, narrowed at each end . . . . .           | <i>scintillans</i> .  |

Of the species named here the following are to my knowledge in cultivation:—*Rh. fastigiatum*, *Rh. flavidum*, *Rh. impeditum*, *Rh. scintillans*.

## SUB-SERIES B.

Scales of the under-leaf indumentum contiguous grey or pale brown, surface punctulate with a few darker scales.

This sub-series of the Lapponicums may be termed the punctulate. It contains:—

- Rh. alpicolum*, Rehd. et Wils.
- Rh. diacritum*, Balf. f. et W. W. Sm.
- Rh. drumonium*, Balf. f. et Ward.
- Rh. nigropunctatum*, Franch.
- Rh. pycnocladum*, Balf. f. et W. W. Sm.
- Rh. telmateium*, Balf. f. et W. W. Sm.
- Rh. thymifolium*, Maxim.

These are all I believe near allies, with perhaps the exception of *Rh. pycnocladum*, which I place here because it shows the character by which all the others are marked—contiguous scales of the under-leaf indumentum with punctulation. This character is an easily recognised one, and I am sure will be of use to cultivators in identifying their plants. There is one other plant which shows the character—the Himalayan *Rh. nivale*, Hook. f.,—but I do not include it here because its habit and other features show it is not really an ally of these other species. It is better taken in a section of high alpinæ, to which I refer hereafter. The fundamental character of punctulation gave origin to Franchet's naming of *Rh. nigropunctatum*. All the species in this group are small shrublets with erect thin twigs and small ovate, or elliptic, or oblong, or lanceolate leaves. *Rh. pycnocladum* is an exception, being a cushion shrub, after the fashion of *Rh. impeditum* and its fellows. The ground-work of under-leaf indumentum is composed of uniform contiguous shining scales which give a greyish or yellowish-grey or pale leather-coloured tint to the whole surface, and upon it the brown punctulations show up. *Rh. pycnocladum* has a bright brown ground-work. The trusses are invariably 1-flowered, and the corolla always of a tint of rose-violet to violet and purple, is lepidote in more than half of them—*Rh. diacritum*, *Rh. drumonium*, *Rh. polycladum*, *Rh. telmateium*. The stamens are 10 (8-10 in *Rh. alpicolum* and *Rh. drumonium*) and always along with the style exerted. In two species only is the glabrous style (hairy in *Rh. alpicolum*) shorter than the stamens, namely, *Rh. alpicolum* and *Rh. thymifolium*.

## KEY TO THE SPECIES.

- |                                      |                    |
|--------------------------------------|--------------------|
| 1. Corolla lepidote                  | 2.                 |
| Corolla elepidote                    | 5.                 |
| 2. Style glabrous, equalling stamens | <i>drumonium</i> . |
| Style glabrous, longer than stamens  | 3.                 |

- |  |                        |
|--|------------------------|
| 3. Leaves dark green above, bright brown below | <i>pycnocladum.</i>    |
| Leaves hoary above, yellow-grey below          | 4.                     |
| 4. Leaves oblong or oblong elliptic            | <i>diacritum.</i>      |
| Leaves narrowly lanceolate                     | <i>telmateium.</i>     |
| 5. Style hairy                                 | <i>alpicolum.</i>      |
| Style glabrous                                 | 6.                     |
| 6. Style longer than stamens                   | <i>nigropunctatum.</i> |
| Style shorter than stamens                     | <i>thymifolium.</i>    |

*Rh. telmateium* is the only one of these that is in cultivation. The plant met with in cultivation under the name *Rh. nigropunctatum* is not *Rh. nigropunctatum*, Franch.

The species of the Lapponicum series in which the scales of the under-leaf indumentum are contiguous without sporadic punctulation, or stand so close together as to leave only narrow chinks uniformly or here and there through which the epidermal surface can be seen, are the majority. One may, however, to assist recognition, segregate them in smaller sub-series.

#### SUB-SERIES C.

Scales of under-leaf indumentum grey or yellowish-grey, contiguous, uniform, forming a shining surface.

This first sub-series I mention is one in which the under-leaf indumentum is composed of truly contiguous, even imbricate, scales which are shining, of a grey or perhaps slightly yellowish tint. This gives the whole surface a uniform coloration in marked contrast with the green upper surface. The species that come into this category are:—

- Rh. blepharocalyx*, Franch.  
*Rh. hippophaeoides*, Balf. f. et W. W. Sm.  
*Rh. idoneum*, Balf. f. et W. W. Sm.  
*Rh. intricatum*, Balf. f. et W. W. Sm.  
*Rh. polifolium*, Franch.  
*Rh. Websterianum*, Rehd. et Wils.

Of these *Rh. hippophaeoides*, *Rh. idoneum*, *Rh. polifolium*, and *Rh. Websterianum* are true members of the Lapponicum series. The first and last very much like in general facies—twiggy hoary shrubs of some size, the former often with long virgate shoots—*Rh. idoneum* a smaller cushion shrub, *Rh. polifolium* an erect twiggy shrub with thin branches resembling much *Rh. thymifolium*, Maxim., but that species has punctulate indumentum. Here I interpolate:—When Franchet says of *Rh. polifolium* "*Rh. thymifolio*, Maxim. affine; ab illo differt gemmis nec unifloris nec ad apicem solitariis, sed constanter 2 vel 3 glomeratis et saepe bifloris," he does not mean, as the type specimens show,

that there is here as in *Rh. dauricum*, Linn. a fascicle of 2-3-flowered umbels at the end of one shoot. The construction is as in others of the Lapponicum series, only here the leafy shoots which end in flower trusses are short and many at the end of the branches, and give somewhat the appearance of an aggregation of umbels. *Rh. blepharocalyx* (which differs from *Rh. intricatum* in having 5 stamens and style shorter than the ovary) and *Rh. intricatum* are included here because of their indumentum. As I have explained under *Rh. complexum* they have a corolla altogether different from the Lapponicums, approaching that of the Anthopogons, the Fragens, the Cephalanthums. In this sub-series we pass from 2-3-flowered inflorescences, as in *Rh. idoneum*, *Rh. polifolium*, and *Rh. Websterianum*, to 6-7-flowered ones in *Rh. hippophaeoides*. 6-7-flowered trusses occur also in *Rh. blepharocalyx* and *Rh. intricatum*. The corolla is some tint of rose-purple to a purple or light blue, and is lepidote only in *Rh. idoneum*. 10 stamens are the rule, 8-10 in *Rh. hippophaeoides*. The style glabrous (in *Rh. Websterianum* sometimes lepidote) is longer than the stamens in *Rh. idoneum* and *Rh. Websterianum*, in the others shorter; in *Rh. intricatum* only about as long as the ovary, in *Rh. blepharocalyx* shorter than the ovary.

## KEY TO THE SPECIES.

- |  |                         |
|--|-------------------------|
| 1. Corolla lepidote . . . . .                                  | <i>idoneum</i> .        |
| Corolla epilidote . . . . .                                    | 2.                      |
| 2. Stamens and style included in corolla tube . . . . .        | 3.                      |
| Stamens and style exserted . . . . .                           | 4.                      |
| 3. Style equalling ovary in length. Stamens 10 . . . . .       | <i>intricatum</i> .     |
| Style much shorter than ovary. Stamens 5 . . . . .             | <i>blepharocalyx</i> .  |
| 4. Inflorescence 6-7-flowered . . . . .                        | <i>hippophaeoides</i> . |
| Inflorescence 2-3-flowered . . . . .                           | 5.                      |
| 5. Calyx coriaceous under 2 cm. long. Style glabrous . . . . . | <i>polifolium</i> .     |
| Calyx membranous 4 mm. long. Style lepidote . . . . .          | <i>Websterianum</i> .   |

Of these species I know in cultivation:—*Rh. idoneum*, *Rh. intricatum*, *Rh. hippophaeoides*.

## SUB-SERIES D.

Scales of under-leaf indumentum large, uniform, and concolorous, contiguous or nearly so, surface never white but fulvous to rufous. Never punctulate.

I associate in a sub-series by themselves three species in which the under-leaf indumentum consists of contiguous, uniform, concolorous scales, but the whole surface is not bright grey or yellowish-grey and shining, but has a more uniform brown tint, even bright cinnamon, through all the scales becoming coloured alike. There is no sporadic punctulation nor is there

an intermixture about equal of dark brown and paler scales. The species showing this character are:—

*Rh. cuneatum*, W. W. Sm.

*Rh. nitidulum*, Rehd. et Wils.

*Rh. tapetiforme*, Balf. f. et Ward.

*Rh. tapetiforme* is, as its name suggests, a carpet-forming species; the others are shrubs, in the case of *Rh. cuneatum* as much as 1.5 m. high. *Rh. cuneatum* is the largest leaved and largest flowered species in the whole Lapponicum series, and the larger leaves, as much as 6 cm. long, often do not suggest the series at all. But it has often quite small leaves, and I think it finds its right place in the series. *Rh. nitidulum* gets its name from the glistening, amber-coloured scales on the upper-leaf surface—a feature well seen also in *Rh. scintillans* of the discontinuous scaled group, and in others occasionally. The flower trusses are 1-2- or 3-flowered. The flower colour, bright rose in *Rh. tapetiforme*, rose lavender in *Rh. cuneatum*, is violet purple in *Rh. nitidulum*. Stamens are 10. The style, glabrous in all, is longer than the stamens in *Rh. cuneatum* (very long) and *Rh. nitidulum*, equalling them in *Rh. tapetiforme*.

#### KEY TO THE SPECIES.

- |  |                      |
|--|----------------------|
| 1. Corolla lepidote. Leaves 3-6 cm. long         | <i>cuneatum</i> .    |
| Corolla elepidote. Leaves 2 cm. long             | 2.                   |
| 2. Flowers rose. Style equalling stamens         | <i>tapetiforme</i> . |
| Flowers violet purple. Style longer than stamens | <i>nitidulum</i> .   |

*Rh. cuneatum* alone of this group is in cultivation, and of its right to a position here I am in some doubt.

#### SUB-SERIES E.

Scales of under-leaf indumentum contiguous or nearly so, relatively large, bicolorous, dark brown or rufous and pale coloured intermixed usually equally.

A number of the species of the Lapponicum series, including *Rh. lapponicum*, Wahlenb. itself, which have contiguous scales on the under-leaf surface show a fulvous tint there which contrasts with the bright grey or yellowish-grey seen in many other species of the series. The cause of this is that the scales are of two colours—some of them brown and these more prominent, others of them remaining a pale grey-green. Often, too, the scales may not be quite contiguous, leaving chinks through which the epidermal surface is visible. These bicolour scales are about equally intermixed in very old leaves, the dark brown which are more projected from the surface may be more numerous.



This is very different from the punctulation found in sub-series B. The species showing the character I mention are :—

*Rh. achroanthum*, Balf. f. et W. W. Sm.

*Rh. capitatum*, Maxim.

*Rh. chryseum*, Balf. f. et Ward.

*Rh. lapponicum*, Wahlenb.

*Rh. parvifolium*, Adams.

*Rh. polycladum*, Franch.

*Rh. rupicolum*, W. W. Sm.

*Rh. violaceum*, Rehd. et Wils.

I think that the species thus brought together may be regarded as more nearly allied to one another than to other species, but the specific differences are marked. In habit they range from prostrate shrubs like *Rh. lapponicum* to erect shrubs of a meter high or more. *Rh. chryseum* is said to be a "dwarf." The flower trusses are most usually 3-5-flowered. In *Rh. lapponicum* 1-flowered. In *Rh. violaceum* 1-3-flowered. In *Rh. chryseum* and *Rh. parvifolium* 6-7-flowered. Flower colour is distinctive in some species—some shade of violet purple in most of them; it is a dark almost purple black in *Rh. rupicolum*, rose in *Rh. capitatum* and *Rh. achroanthum*, yellow in *Rh. chryseum*. Lepidote corollas characterise *Rh. achroanthum*, *Rh. chryseum*, and *Rh. rupicolum*. The stamens are 5 in *Rh. achroanthum* and *Rh. chryseum*, 5-6 in *Rh. lapponicum*, 8-10 in *Rh. capitatum* and *Rh. rupicolum*, 10 in all the others. The style always exserted and longer than the stamens is glabrous in *Rh. lapponicum*, *Rh. polycladum*, *Rh. parvifolium*, and *Rh. violaceum*.

#### KEY TO THE SPECIES.

- |  |                      |
|--|----------------------|
| 1. Corolla lepidote . . . . .                                      | 2.                   |
| Corolla elepidote . . . . .  | 4.                   |
| 2. Flowers yellow . . . . .  | <i>chryseum</i> .    |
| Flowers rose or purple tinted . . . . .                            | 3.                   |
| 3. Corolla rose. Stamens 5 . . . . .                               | <i>achroanthum</i> . |
| Corolla black purple. Stamens 10 . . . . .                         | <i>rupicolum</i> .   |
| 4. Leaves oblong or sub lanceolate, narrowed to each end . . . . . | 5.                   |
| Leaves ovate to elliptic, rounded at each end . . . . .            | 7.                   |
| 5. Style hairy, longer than stamens . . . . .                      | <i>capitatum</i> .   |
| Style glabrous, longer than stamens . . . . .                      | 6.                   |
| 6. Inflorescence 1-flowered . . . . .                              | <i>lapponicum</i> .  |
| Inflorescence 3-5-flowered . . . . .                               | <i>polycladum</i> .  |
| Inflorescence 6-7-flowered . . . . .                               | <i>parvifolium</i> . |
| 7. Inflorescence 1-flowered. Stamens 5-6 . . . . .                 | <i>lapponicum</i> .  |
| Inflorescence 1-3-flowered. Stamens 8-10 . . . . .                 | <i>violaceum</i> .   |

Cultivated species of the foregoing are :—*Rh. chryseum*, *Rh. lapponicum*, *Rh. parvifolium*.

#### SUB-SERIES F.

Shrubs with very small, thick, rounded, even orbicular, leaves. Upper-leaf surface dark green, with withered contiguous scales amber-coloured shining. Under-leaf scales contiguous, sometimes bicolour and punctulate. Inflorescence 1-flowered. Corolla elepidote. Style glabrous.

The species

*Rh. Edgarianum*, Rehd. et Wils.,

*Rh. nivale*, Hook. f.,

*Rh. ramosissimum*, Franch.,

are perhaps allied species within the Lapponicum series. I confess, however, that I do not know much of either *Rh. Edgarianum* or *Rh. ramosissimum*, and grouping them as I do is yielding to the consideration that they seem more like in leaf form to one another than to other species in the Lapponicum series, and it is convenient for practical identification so to arrange them. We have only two small specimens of the former in the Edinburgh Herbarium under Wilson No. 1319, and none of the latter. *Rh. nivale* is a dwarf, prostrate, carpet shrub only a few inches high, the others are small bushes. All three species have very small leaves, rounded or approaching the orbicular, with contiguous amber coloured scales above, some of them becoming quite brown. Beneath the scales are also contiguous in *Rh. Edgarianum* and *Rh. ramosissimum*, rufous not punctulate or sometimes a portion remains greenish; in *Rh. nivale* the majority are pale fulvous brown whilst the others are very dark brown, and if there are very few the aspect of the surface is somewhat punctulate. Solitary terminal flowers are in all of them, and the corolla is elepidote rose and rose purple to purple. The form of the corolla in *Rh. Edgarianum* and *Rh. nivale*, in which only I have seen it, seems to argue against placing them together, for in *Rh. nivale* it has a short cylindric tube with a close villous throat annulus, but is funnel shaped, with a pubescent throat in *Rh. Edgarianum*. Taking Franchet's description of *Rh. ramosissimum*, "corolla fauce pilis destituta poculiformis," we have a suggestion of a very different corolla. I have not had opportunity of dissecting a flower of true *Rh. ramosissimum* as described by Franchet, but I have examined one from Wilson's plant No. 1319, ascribed to *Rh. ramosissimum*, Franch. In it there is quite a long (for the Lapponicum group) tube villous at the throat. Then Rehder and Wilson say purple for colour not rose as Franchet gives it, and further their plant is tall, Franchet's

"humilis." Rehder and Wilson's is an interesting plant with foliage that would well suit the grouping I make, which must be taken however as having no special reference to Rehder and Wilson's plant. *Rh. nivale* has 10 stamens; 8 only are described in the other species, though I found 10 in a flower of Rehder and Wilson's plant. The style is particularly long in *Rh. nivale*, exceeding the stamens, as also in *Rh. Edgarianum*, but is shorter in *Rh. ramosissimum*. The capsule, as might be expected in the very high alpine *Rh. nivale*, seems to be much larger than in *Rh. Edgarianum*.

#### KEY TO THE SPECIES.

- Erect shrub with thick intricate branches.  
Under-leaf surface rufous not punctulate. Corolla rose purple to purple, tube funnel-shaped, throat pubescent. Stamens 8-10. Style longer than stamens. . . . . *Edgarianum*.
- Prostrate carpet shrub with thick intricate branches. Under-leaf surface brown, punctulate. Corolla red purple, throat villous. Stamens 10. Style longer than stamens. . . . . *nivale*.
- Humble shrub with intricate branches. Under-leaf surface fulvously lepidote not punctulate. Corolla cup-shaped, rose, throat glabrous. Stamens 8. Style shorter than stamens. . . . . *ramosissimum*.

*Rh. nivale* only is in cultivation to my knowledge. Plants under the name *Rh. Edgarianum* are in gardens, but I have not found any plants so-called correspond to Rehder and Wilson's description.

#### CEPHALANTHUM SERIES.

The type of *Rhododendron* exhibited by *Rh. cephalanthum*, Franch. has been known to us otherwise only in *Rh. Sargentianum*, Rehder et Wilson from West Szechwan. Now, owing to the exploration of Forrest and of Kingdon Ward, we discover that the type has a remarkable development in West Yunnan and the bordering region of East Burma and Tibet. A dozen species have to be added. Taking for the group the name *Cephalanthum* from the oldest described species, the species composing it with their distribution is given in the following table:—

<i>Rh. acraium</i> , Balf. f. et W. W. Sm.	Yunnan: Chungtien plateau, 12,000-13,000 ft.
<i>Rh. cephalanthoides</i> , Balf. f. et W. W. Sm.	Yunnan: Lichiang, 12,000- 13,000 ft.

<i>Rh. cephalanthum</i> , Franch.	Yunnan: Tali Range, E. flank, 10,000-12,000 ft.
<i>Rh. chamaetortum</i> , Balf. f. et Ward.	Tibeto-Yunnan frontier: Kagr-pw Glacier Valley, 15,000 ft.
<i>Rh. gymnomiscum</i> , Balf. f. et Ward.	Tibeto-Yunnan frontier: Kagr-pw Glacier Valley, 14,000 ft.
<i>Rh. hedyosmum</i> , Balf. f.	Szechwan?
<i>Rh. ledoides</i> , Balf. f. et W. W. Sm.	Yunnan: N.E. of Yangtze bend, 13,000 ft.
<i>Rh. lepidanthum</i> , Balf. f. et W. W. Sm.	Yunnan: Lichiang, 11,000-14,000 ft.
<i>Rh. nwaïense</i> , Balf. f. et Ward.	E. Upper Burma: Nwai Divide, 12,000-13,000 ft.
<i>Rh. platyphyllum</i> , Balf. f. et W. W. Sm.	Yunnan: Tali Range, E. flank, 10,000-11,000 ft.
<i>Rh. praeclarum</i> , Balf. f. et Farrer.	Kansu.
<i>Rh. radinum</i> , Balf. f. et W. W. Sm.	Yunnan: Lichiang, 11,000-12,000 ft.
<i>Rh. Sargentianum</i> , Rehder et Wilson.	W. Szechwan, 10,000-14,000 ft.
<i>Rh. sphaeranthum</i> , Balf. f. et W. W. Sm.	Yunnan: Fengkow Valley, 12,000-13,000 ft.

Excepting *Rh. cephalanthum* and *Rh. Sargentianum* all the species are described in the preceding pages.

All these are dwarf, shrubby, aromatic plants with small (with but few exceptions) repand leathery leaves, dark green above and with a lax (spongy) never blood-red scale indumentum below; and they show general uniformity in the form of the foliage-bud scale-leaves persistent or deciduous, the complanate or convolute vernation with bright yellow young parts, the bistrate (long and short) indumentum of scales the longer of which lose their disks and become setae, the dense capituliform inflorescences with overlapping deciduous bracts and conspicuous bracteoles, the small green or reddish calyx cut to the base usually, the tubular oblique corolla tube often long and villous inside usually bearded at the mouth, the included stamens glabrous or puberulous, the short lepidote ovary and style never much longer than the ovary but often shorter. Of the fruit we know little—where known it is a lepidote capsule invested by the calyx and dehiscing to the base.

The whole series has affinity with the series of *Anthopogons* and of *Fragrans*. Franchet in the description of *Rh. cephalan-*

*thum* cited below refers to the relationship and points out the diagnostic feature of the indumentum of the leaf under-surface. This character is a valuable differential one and easily observed. I speak of the indumentum in the *Cephalanthum* series as spongy because of its loose character and it is never blood-red. In the *Fragrans* series it is compact and never blood-red. In the *Anthopogon* series it is agglutinated and always blood-red.

We have to learn a good deal more of these species before a comprehensive story of the *Cephalanthum* series can be written. Meanwhile I give the following tentative key of differential characters. The material for examination of most of the species is not abundant, and may be found hereafter to have been inadequate for a true picture of the species described without, however, upsetting the specific determinations.

## KEY TO THE SPECIES.

- |  |                         |
|--|-------------------------|
| 1. Under-leaf indumentum spongy . . . . .  | 2.                      |
| Under-leaf indumentum loose but hardly spongy . . . . .  | 12.                     |
| 2. Perulae persistent . . . . .  | 3.                      |
| Perulae deciduous . . . . .  | 7.                      |
| 3. Corolla lepidote . . . . .  | 4.                      |
| Corolla elepidote . . . . .  | 6.                      |
| 4. Pedicels none. Flowers rose-tinted . . . . .  | <i>radinum.</i>         |
| Pedicels 7-8 mm. long lepidote . . . . .   | 5.                      |
| 5. Stamens hairy. Flowers white . . . . .  | <i>lepidanthum.</i>     |
| Stamens glabrous. Flowers pale yellow . . . . .  | <i>Sargentianum.</i>    |
| 6. Leaves 5 cm. long. Bracteoles longer than calyx. Flowers cream-coloured . . . . .                         | <i>platyphyllum.</i>    |
| Leaves 4 cm. long. Bracteoles shorter than calyx. Flowers white . . . . .                                    | <i>cephalanthum.</i>    |
| 7. Corolla hairy outside . . . . .   | 8.                      |
| Corolla glabrous outside . . . . .   | 9.                      |
| 8. Bracteoles shorter than calyx. Inflorescence axis elepidote. Flowers white. Stamens glabrous . . . . .    | <i>cephalanthoides.</i> |
| Bracteoles much longer than calyx. Inflorescence axis lepidote. Flowers rose-tinted. Stamens hairy . . . . . | <i>sphaeranthum.</i>    |
| 9. Stamens glabrous . . . . .  | 10.                     |
| Stamens hairy . . . . .  | 11.                     |
| 10. Flowers white. Calyx setulose-ciliate . . . . .  | <i>hedyosmum.</i>       |
| Flowers bright yellow. Calyx scale-fimbriate . . . . .   | <i>praeclarum.</i>      |
| 11. Inflorescence axis lepidote. Calyx eciliate . . . . .  | <i>acraium.</i>         |
| Inflorescence axis puberulous. Calyx ciliate . . . . .   | <i>ledoides.</i>        |



- |   |                       |
|---|-----------------------|
| 12. Perulae persistent                        | 13.                   |
| Perulae deciduous. Pedicels glabrous.         |                       |
| Corolla yellow, glabrous outside              | <i>gymnomiscum</i>    |
| 13. Pedicels lepidote. Calyx scale-fimbriate. |                       |
| Corolla yellow, glabrous outside              | <i>nwaiense</i> .     |
| Pedicels hairy. Calyx ciliate. Corolla pink,  |                       |
| lepidote outside                              | <i>chamaetortum</i> . |

The following are in cultivation:—*Rh. cephalanthoides*, *Rh. cephalanthum*, *Rh. hedyosmum*, *Rh. ledoides*, *Rh. Sargentianum*, *Rh. sphaeranthum*.

*Rh. cephalanthum*, Franch. was described by Franchet in 1885,\* and subsequently in 1886† Franchet supplemented his description. The plant has been in cultivation for several years, introduced, I suppose, through the French missionaries. It has not yet been figured, and I do not know of a description of it other than Franchet's original one. It may be of use, therefore, if I give a description here drawn from the plant as it has grown and flowered for some years past in the Royal Botanic Garden:—

*Rh. cephalanthum*.—Small shrub about 6 cm. high feathered to the ground with short stoutish erect branches annual growths about 4 cm. long. Twigs of the year pale yellow scurfy with an abundance of pale yellow peltate scales on long stalks raising them from the pale green surface of the branch which is coated by a stratum of shorter-stalked peltate scales; the disk of the long scales has a broad umbo and its equally

\* Franch. in Bull. Soc. Bot. France, xxxii (1885), 9. Franchet's description runs:—

*Rhododendron cephalanthum*, sp. nov.—Pedale vel sesquipedale, ramosum, cortice ramorum anni praeteriti cinereo; facile deterisili, ramulis hornotinis breviter setuloso-glandulosis. Folia obovato-oblonga, in petiolum 5-6 mill. longum attenuata, supra intense viridia, asperata, subtus dense lepidota, quamvis elevatis, fuscis; perulae ovatae, ciliolatae, juvenilibus lepidotis. Flores 8-15 ad apicem ramorum dense congesti; calyx breviter pedicellatus, bracteola lineari stipatus, membranaceus, lepidotus, campanulatus, ad medium vel paulo ultra 5-lobus, lobis inaequalibus margine ciliatis, nunc apice rotundatis, nunc subacutis; corolla alba, glabra; tubus cylindricus, calyce vix duplo longior (1 cent. circiter longus), intus dense villosus; limbus explanatus tubo subduplo brevior, lobis rotundatis basi sese invicem obtegentibus; stamina 7-8, tubo breviora, filamentis sparse pilosis. Ovarium lepidotum.

In cacumine montis Koua-la-po, prope Ho-kin; 26 maj. 1884. No. 59.

Espèce intermédiaire entre le *R. anthopogonoides*, Maxim. et le *R. anthopogon*, Don. Elle diffère du premier par le tube de la corolle beaucoup plus court, et par ses feuilles atténuées à la base; du *R. anthopogon*, par ses fleurs plus nombreuses, par ses filets staminaux poilus; elle s'éloigne de l'un et de l'autre par ses fleurs blanches, par les écailles de la face inférieure des feuilles, qui sont très saillantes.

† Franchet in Bull. Soc. Bot. France, xxxiii (1886), 234. Franchet here adds:—

*R. cephalanthum*, Franch.—Folia subtus pilis agariciformibus dense vestita.

broad fringe is fimbriate; the shorter scales have incomplete disks in all degrees. The second year shoots are darker green and the long scales more separate. In the third year the shoots are brown and many or most of the long scales have now lost their disk and the stalk alone remains as a short seta—a procedure strikingly characteristic of this plant and its allies—a year or two thereafter the grey outer surface of the branch peels off. Foliage-bud outer scale-leaves about 6 mm. long and at base 2 mm. wide tapering from base to a sharp point prominently keeled lepidote on back and margin puberulous inside, innermost scale-leaves oblong spatulate about 1.4 cm. long 3 mm. broad lepidote on back where is a prominent midrib with long cilia on margin and puberulous inside; all foliage-bud scale-leaves arise at about same level and are persistent becoming woody so that bases or annual growth on the branches are marked by rosettes of woody scale-leaves. Leaves stalked as much as 4 cm. long; blade thick and leathery about 3.5 cm. long and 1.5 cm. broad spreading nearly at right angles to stalk which is at first adpressed later acutely diverging oblong obtuse with mid-nerve running out into a mucro which is recurved and making leaf appear somewhat emarginate, margin somewhat cartilaginous roughened by bases of fallen setae occasionally one or two setae remain (margin of young leaves setulose), base broad with rounded lobes not cordulate; upper surface convex in young leaves grey with peltate scales hardly contiguous in older leaves dark green shining showing traces of fallen scales and often over the sulcate midrib setulose from scale-stalks, primary veins on each side of midrib about 7 and sulcate at origin; under surface of young leaves pale yellow green of old leaves a dirty fawn colour densely clad with a persistent scurf of long and shorter peltate scales the longer with broad disks slightly separate from one another covering the shorter ones below, the midrib elevated at first concealed by scales later pale straw-coloured and sparingly lepidote, other venation hidden; petiole about 5 mm. long stout scurfily lepidote like stem and leaf under-surface. Flowers white some 8–10 racemously arranged in small head-like terminal trusses upon a lepidote rhachis the whole inflorescence immersed in the precociously developing leafy shoots from below the inflorescence; outer bracts fulvous brown crustaceously leathery broadly ovate or rounded about 6 mm. long and 4.5 mm. broad somewhat truncate and abruptly apiculate lepidote on back and ciliate at margin; the fertile bracts obovate or subspathulate hooded about 1 cm. long and nearly 5 mm. broad somewhat membranous yellowish densely lepidote outside and ciliate with contorted hairs at margin puberulous inside; bracteoles as much as 8 mm. long not equalling calyx and 2 mm. broad spatulate greenish

yellow lepidote above and ciliate; pedicels as much as 4.5 mm. long lepidote. Calyx campanulate green membranous as much as 7 mm. long cut almost to the base, lobes subequal ovate acute lepidote on back and ciliate with twisted hairs largest lobe about 3 mm. broad. Corolla oblique about 1.8 cm. long with a tube about 1 cm. long glabrous outside villous inside expanding into a limb with 5 crenulate imbricate lobes rounded somewhat fleshy and about 5 mm. in diam. Stamens much shorter than corolla tube about 6 mm. long the filaments dilated at base and there puberulous, anthers oblong about 1.5 mm. long. The ovary is about 2 mm. long and coated with yellow scales all over and the style is only about 1 mm. long.